RESPONSE ACTION CONTRACT

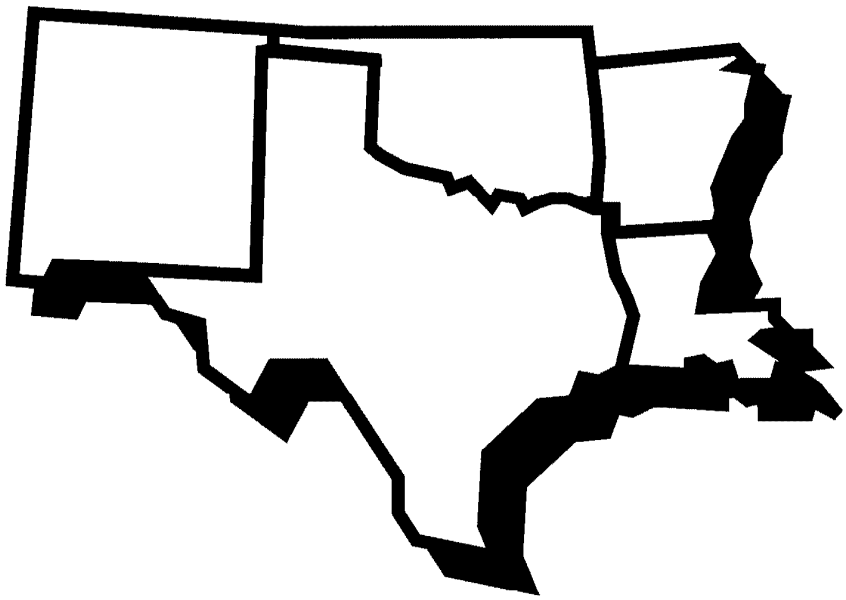
United States Environmental Protection Agency Region 6

Contract No. 68-W6-0036

Version 1.1

Field Sampling Plan
Remedial Investigation/Feasibility Study
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

Response Action Contract No. 68-W6-0036
Work Assignment No. 961-RICO-06HZ
DCN 01-3463



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Geo-Marine, Inc.

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Field Sampling Plan
Griggs and Walnut Groundwater Plume Site
Las Cruces, Doña Ana County, New Mexico

Response Action Contract No. 68-W6-0036
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Prepared for:

U.S. Environmental Protection Agency

Prepared by:
CH2M HILL, INC
March 2002

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Preface

The U. S. Environmental Protection Agency, Region 6 (EPA) has retained CH2M Hill, Inc. under Response Action Contract No. 68-W6-0036, Work Assignment No. 961-RICO-06HZ to develop the site-specific planning documents for the Remedial Investigation/Feasibility Study (RI/FS) at the Griggs and Walnut Groundwater Plume (GWP) Site in Las Cruces, Doña Ana County, New Mexico. The site-specific planning documents for the GWP RI/FS consist of the following five separately-bound documents:

- RI/FS Technical Activities Work Plan (**CH2M HILL, 2002a**)
- Health and Safety Plan (**CH2M HILL, 2002b**)
- Field Sampling Plan
- Quality Assurance Project Plan (**CH2M HILL, 2002c**)
- Site Management Plan (**CH2M HILL, 2002d**)

The RI/FS Technical Activities Work Plan (TAWP) develops a Site Conceptual Model and outlines Data Quality Objectives based on a detailed review of the historical information available for the site and provides a general description of the tasks to be conducted during the RI/FS. The Site Management Plan (SMP) provides detailed procedures for site control and security and management of investigation-derived waste to be utilitzed during implementation of the field work. The Quality Assurance Project Plan (QAPP) provides Quality Control/Quality Assurance requirements to ensure that the data which obtained is suitable for its intended purpose. Health and Safety procedures to be used during implementation of the RI/FS field activities are presented in the Health and Safety Plan (HSP).

This Field Sampling Plan (FSP) provides detailed methods and procedures to be used during implementation of field activities in order to obtain the information required to complete the RI/FS. It has been prepared as a companion document to the other planning documents listed above.

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List of Acronyms

ASTM	American Society for Testing and Materials
bgs	below ground surface
CLC	City of Las Cruces, New Mexico
CLP	Contract Laboratory Program
COC	Chain of Custody
DACTD	Dona Ana County Transportation Department
DMP	Data Management Plan
DO	Dissolved Oxygen
DPT	Direct-Push Technology
DQOs	Data Quality Objectives
EC	Electrical Conductivity
EDD	Electronic Data Deliverable
EDMS	Environmental Data Management System
EPA	US Environmental Protection Agency
FLUTe	Flexible Liner Underground Technologies
FSI	Focused Site Inspection
FSP	Field Sampling Plan
FTL	Field Team Leader
gpm	gallons per minute
GWP	Griggs and Walnut Ground Water Plume Superfund Site
HRS	Hazard Ranking System
HSA	Hollow Stem Auger
HSP	Health and Safety Plan
ID	Internal Diameter
IDW	Investigation Derived Waste
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Limit
MS/MSD	Matrix Spike/Matirx Spike Duplicate
NMED	New Mexico Environment Department
NPL	National Priorities List
PA	Preliminary Assessment
PCE	tetrachlorothene, or perchloroethene
PCR	Property Control Representative
PID	Photoionization Detector
PM	Project Manager
ppb-v	parts per billion by volume
PPE	Personal Protective Equipment
psi	pounds per sqaure inch
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan

List of Acronyms

QA/QC	Quality Assurance/Quality Control
RI/FS	Remedial Investigation/Feasibility Study
RSCC	EPA's Regional Sample Control Coordinator
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SMP	Site Management Plan
SSSR	Superfund Site Strategy Recommendation
TAWP	Technical Activities Work Plan
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
ug/L	Micrograms per Liter
ug/Kg	Micrograms per Kilogram
USTB	Underground Storage Tank Bureau
VOCs	Volatile Organic Compounds

Section 1
Introduction

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Section 1

Introduction

This Field Sampling Plan (FSP) has been prepared to describe the field activities to be conducted in support of a Remedial Investigation/Feasibility Study (RI/FS) for the Griggs and Walnut Groundwater Plume (GWP) Site. The U.S. Environmental Protection Agency (EPA) has determined that a RI/FS is necessary to evaluate the nature and extent of previously identified contamination, to support selection of appropriate response actions for this site, and to locate potential sources of the contamination. An overview of the RI/FS work tasks to be conducted for this site is provided in Section 5 of the RI/FS Technical Activities Work Plan (TAWP) (**CH2M HILL, 2002a**).

1.1 Site Description and Background

The GWP site is a contaminated groundwater plume centered near the intersection of Griggs Avenue and Walnut Street in Las Cruces, Doña Ana County, New Mexico. The geographic coordinates at this location are approximately 32˚18' 56.0" north latitude and 106˚45' 36.0" west longitude. Four municipal drinking water supply wells within the site are affected (**EPA, 2000b**), although only one, Well No. 18 (out of service since 1996), has demonstrated concentrations of PCE above the MCL. This well is located at the DACTD maintenance yard, near the intersection of Griggs and Walnut. A fifth well, CLC Well No. 24 located south of the site, has demonstrated detections of PCE in recent sampling events beginning in June 2001; this detection may or may not be related to the GWP site (wells in between this well and the site are not affected). A brief description of the site investigative history and environmental setting is provided in the following paragraphs. A map of the site is provided as **Figure 1-1**.

1.1.1 Site Investigation History

The NMED Superfund Oversight Section began investigating the groundwater contamination at the GWP site in May 1997. A Preliminary Assessment (PA) Report for the site was issued by NMED on October 30, 1997. The report concluded that the threat to human health through the groundwater pathway is likely significant. The report also stated that the source of the contamination had not been identified, and therefore the surface water, soil, and air pathways could not be characterized at that time (**NMED, 1997**). The conclusions of the PA led the EPA to issue a Superfund Site Strategy Recommendation (SSSR) for the site. The SSSR recommended that NMED conduct a Focused Site Inspection (FSI) to determine the extent of the contamination and determine the location of potential sources (**EPA, 1998b**). In December

1997, a LUST investigation was conducted under the authority of the USTB of the NMED at the Gas Card LUST site (identified in NMED documents as the Shook Well). The Gas Card Site is located approximately 0.6 miles northwest of Well No. 18 at the intersection of Solano Drive and Augustine Avenue. Five soil borings were drilled, and one monitor well, MW-1 (the Gas Card well), was installed. Groundwater was encountered at 102 feet below ground surface (bgs). Two soil samples were collected from each boring, and one groundwater sample was collected from the well, for analysis of petroleum-related constituents. PCE was not analyzed in any of these samples. The analytical results showed elevated concentrations of Total Petroleum Hydrocarbons (TPH) in one soil boring. No petroleum-related constituents were detected in the groundwater sample (**SMA, 1997b**). The NMED Superfund Oversight Section collected groundwater samples from the Gas Card well in June 1998 and July 1999. The analytical results revealed the presence of PCE in the groundwater at concentrations exceeding the MCL at concentrations ranging between 11.0 and 17.0 ug/L (**EPA, 2000b**).

Beginning in June 1997, a separate investigation was conducted at another LUST site at the DACTD maintenance yard. This investigation was conducted in response to a fuel spill at the site. The first phase of the investigation involved the drilling of one soil boring and the installation of one monitor well, MW-1. Groundwater was encountered at 187 feet bgs. Two soil samples and one groundwater sample were collected for analysis of petroleum-related constituents. The soil samples, collected at 165 and 195 feet bgs, and the groundwater sample revealed the presence of gasoline-related constituents (**SMA, 1997a**). The presence of contamination led to further investigation at the site in February and March 1998. The NMED Superfund Oversight Section participated in this investigation as part of their groundwater investigation of the PCE contamination in CLC Well No. 18. Five additional monitor wells, MW-2 through MW-6, were installed at the site (see **Figure 1-1** for well locations at the site), and soil samples were collected during drilling for analysis of petroleum-related hydrocarbons (**SMA, 1998**). NMED representatives collected split soil samples for analysis of volatile organic compounds (VOCs).

Of the samples analyzed, PCE was detected at 241 micrograms per kilogram (ug/Kg) in only one soil sample, from MW-5, at 135 feet bgs (**EPA, 2000b**). Groundwater samples collected from MW-2 through MW-6 in March 1998 showed no hydrocarbon-related contamination, but PCE was detected in samples from wells MW-2 through MW-5. The MCL was exceeded in samples from wells MW-2 (52.0 ug/L), MW-3 (20 ug/L), and MW-4 (8.1 ug/L) (**SMA, 1998**). Because of the PCE detections, the NMED

Superfund Oversight Section performed additional monitoring at theses wells in April 1998, July 1999, March 2000, and July 2000. In each event, the PCE concentration detected exceeded the MCL in samples from wells MW-2 through MW-4. The PCE concentration exceeded the MCL in samples from MW-5 in March (6.0 ug/L) and July 2000 (8.0 ug/L), and the PCE concentration exceeded the MCL in the sample from MW-1 (7.0 ug/L) in July 2000. **Table 1-1** shows the sample analytical results for the wells that have been sampled during the site's investigation history. The HRS Documentation Record indicates that the site references consider the PCE contamination detected in the monitor wells to be unrelated to the fuel spill at the DACTD LUST site (**EPA, 2000b**).

The findings of the SSSR led the NMED Superfund Oversight Section to conduct additional investigations at the GWP site. These investigations were conducted in a phased approach between 1997 and 2000. Part of this investigation included the groundwater sampling from the wells at the DACTD site and the Gas Card Site. Also, two surface water samples were collected from drainage sumps located near the diesel shop at the DACTD facility in October 1998. PCE was detected in one of these surface water samples at 3.3 ug/L. In July 1999, the NMED Superfund Oversight Section also conducted a shallow soil vapor investigation at the DACTD yard, with soil vapor samples collected to 8 feet bgs. PCE concentrations in the shallow soil vapor ranged from non-detect up to 12 parts per billion by volume (ppb-v), with the highest concentrations occurring in the northeast corner of the yard.

The results of the soil vapor study led the NMED Superfund Oversight Section to install additional monitor wells (MW-SF1 through MW-SF10) between February and June 2000. These wells were located within the vicinity of Well No. 18, the DACTD maintenance yard, and the Gas Card Site. Groundwater samples collected from these wells in March and July 2000 revealed the presence of PCE in samples from nine of the wells (MW-SF1 through MW-SF8 and MW-SF10), and the PCE concentration exceeded the MCL in samples from eight of the wells (MW-SF1 through MW-SF5, MW-SF7, MW-SF8, and MW-SF10). Four of the wells were installed at the DACTD maintenance yard. The PCE concentrations detected in these wells ranged from 19 to 52 ug/L.

The NMED Superfund Oversight Section also sampled two additional municipal water supply wells (CLC Well Nos. 10 and 54), an additional city-owned well (the Paz Park Well), and two private wells (identified as wells LRG-3191 and LRG-7375) as part of their investigation. Well LRG-3191 was

sampled during March and June 1998. LRG-7375 was sampled in January and June 1998. CLC Well 10 was sampled in July 1999. CLC Well 54 was sampled in July 1999 and April 2000, and the Paz Park Well was sampled April and June 1998, and July 1999. Of these wells, PCE was only detected in the sample from private well LRG-3191, at a concentration of 1.0 ug/L. Monitor well MW-SF8, located on Santa Fe Street between Pinion Avenue and Picacho Avenue, represents the furthest upgradient detection of PCE (**EPA, 2000b**).

In March 2001, a soil investigation and groundwater sampling was conducted at another LUST site, the Circle K Store #1306, located approximately 0.3 miles north of the Gas Card site and 0.2 miles east of CLC Well No. 10. The Circle K #1306 site has been monitored by the USTB since a petroleum product release was identified at the site in 1991. The March 2001 investigation was conducted to support a risk assessment for the site. During this investigation, the eight monitor wells at the site were sampled, and one soil boring was completed. Five soil samples were collected from the soil boring. At the request of the NMED USTB, all the samples were analyzed for a wide range of VOCs, and PCE was not detected in any of the soil or groundwater samples (**CDM, 2001**).

In May 2001, the NMED Drinking Water Bureau began monthly sampling of the municipal supply wells that contained PCE to determine if PCE concentrations were approaching the MCL. This sampling included only those wells that were being used to supply drinking water to the system, which included CLC Wells Nos. 19 and 21, and beginning in June, CLC Well No. 27. The sampling and analytical method associated with these sampling events is not specifically documented for this effort, although standard NMED procedures would have been followed; no QA/QC samples were collected as part of these sampling efforts. Based on the analytical results, the PCE concentration has risen in all the wells previously known to be affected by PCE, and PCE was detected in another well, CLC Well No. 24, at a concentration of 1.5 ug/L, during a compliance sampling event in June 2001. It is important to note, however, that three wells located between Well No. 24 and the GWP Site wells do not demonstrate the presence of PCE (CLC Wells Nos. 20, 26, and 61). As a result, the PCE contamination in Well No. 24 may or may not be related to the GWP Site. Other than Well No. 18 (which is out of use), the affected supply wells have not yet demonstrated detections above MCLs.

During the June 2001 sampling round, samples from Well No. 27 demonstrated a PCE concentration of 4.5 ug/L, samples from Well No. 21 demonstrated a PCE concentration of 3.4 ug/L, and samples from Well No. 19 demonstrated a PCE concentration of 1.4 ug/L. A sample collected from Well No. 27 during August 2001 revealed a PCE concentration of 4.9 ug/L. As a result of the continued elevated concentrations in Well No. 27, the CLC discontinued pumping from this well into the water supply system. The CLC continued to pump the well four hours a day, discharging the water to the sanitary sewer. The continued pumping will help keep the PCE contaminant plume from migrating toward other pumping wells. The June 2001 sampling round also showed detection of PCE at 1.5 ug/L in a sample from CLC Well No. 24, a previously unaffected well (**Figure 1-1** shows the location of each City well mentioned above).

To date, PCE has been detected in five municipal supply wells (Nos. 18, 19, 21, 24, and 27), 16 monitor wells (the six wells at the DACTD facility, the Gas Card well, and nine of the ten monitor wells installed by the NMED Superfund Section), and one private well used for irrigation (LRG-3191). The furthest upgradient well known to contain PCE, MW-SF8 (located on Santa Fe Street between Pinion Avenue and Picacho Avenue), is located over 4,000 feet west-northwest of the DACTD facility. **Figure 1-2** shows the locations of each well discussed in the HRS documentation. The location of the Circle K #1306 is also shown on this map (where monitor wells showed no detections of PCE). **Table 1-1** shows the concentrations of PCE detected in the wells associated with the site. It should be noted that the monitor wells are screened at the water table, which occurs at a much shallower depth than the well screens for the city's municipal water supply wells.

In November 2000, EPA Region 6 prepared the HRS Documentation Record for the GWP site to evaluate whether the site should be placed on the NPL. The HRS score for the site was 50, which was well above the 28.5 score used to determine if a site should be placed on the NPL (**EPA, 2000b**). The site was proposed for inclusion on the NPL in January 2001 (**66 FR 2380, January 11, 2001**), and added to the NPL in June 2001 (**66 FR 32235, June 14, 2001**).

1.1.2 Sources of Contamination

Site investigation activities were conducted by the NMED Superfund Oversight Section between 1997 and 2000 to identify the source and extent of the PCE contaminated groundwater plume. Several potential sources were identified as a result of this investigation, but attribution to a specific source or sources of the contamination was not identified or confirmed. In addition, the extent of contamination was not completely defined by the locations of the wells installed. The HRS package lists several potential sources for the ground water contamination that were identified by the NMED. A summary of the NMED Superfund Oversight Section's findings regarding the source, nature, and extent of contamination is described in the following paragraphs. After the HRS package was released, it was identified that the City of Las Cruces Fleet Maintenance Yard operation included a PCE tank, handled by Safety Kleen. Because PCE use at the site has been documented, the Fleet Maintenance yard is added to the list of potential sources for the site.

The NMED Superfund Oversight Section attempted to identify the source of the contamination by locating nearby facilities that potentially used PCE as part of their operations. PCE was first developed in the early 1900's in Europe in an attempt to develop chemical commodities produced from acetylene. Commercial production in the United States began in 1925, and widespread use of PCE in the dry cleaning industry began in the 1930's (**IRAC, 1979**). PCE is widely used in dry cleaning. Other uses of PCE include textile processing, metals cleaning, vapor degreasing, rubber coatings, solvent soaps, printing inks, adhesives and glues, sealants, polishes, lubricants, silicones, and in the electronics industry as a photoresist stripper (**ATSDR, 1991**).

Facilities that may have used or managed PCE in the vicinity of the affected groundwater include the following (the locations of these facilities are illustrated on **Figure 1-3**):

- DACTD Maintenance Yard (where Well No. 18 is located).
- The former Crawford Airport (formerly located near the northeast corner of Hadley Avenue and Solano Drive, until the 1960s) (**EPA, 2000b**)
- The former National Guard Armory (formerly located near the northeast corner of Hadley Avenue and Solano Drive, until 1990) (**EPA, 2000b**).

- Private dry-cleaning facilities
- Old Las Cruces Landfill (located east of the GWP affected area) and the Las Cruces Landfill (not shown on **Figure 1-3**, but located approximately 1 mile further to the east).
- The City of Las Cruces Fleet Maintenance Yard, located at 1501 East Hadley (also the former location of the Crawford Airport).

The difficulty in finding the specific source of the PCE contamination is not unexpected; multiple sources may be contributing to the contamination (**EPA, 2000b**). PCE use is likely to have occurred at each of these facilities, but whether or not any have contributed to the PCE-affected groundwater has not been confirmed. The RI will include further field investigation where PCE has been detected in soil and/or soil vapor to verify whether there is a link to the groundwater plume, and use delineation of the horizontal extent of the plume to determine what further investigation is warranted at other potential sources.

1.1.3 Nature and Extent of Contamination

The investigation activities conducted by the NMED Superfund Oversight Section resulted in limited soil sampling at select locations, limited surface water sampling at select locations, a soil vapor survey, and groundwater sampling. These activities identified PCE in one soil and one surface water sample at the DACTD facility. The soil vapor survey identified PCE in the soil vapor at the DACTD facility. The soil vapor survey measured soil vapor concentrations at 8 feet bgs, and PCE concentrations ranged from non-detect to 12 ppb-v (**NMED, 1999**). PCE was detected in groundwater samples at various locations.

The monitor wells installed by the NMED Superfund Oversight Section provided good information about the horizontal extent of the plume and concentrations at the water table, but the full horizontal and vertical extent is not completely defined by these wells. PCE in its original form is a dense non-aqueous phase liquid (DNAPL). To-date, only dissolved phase concentrations have been detected (no DNAPL). Dissolved PCE was detected both upgradient and downgradient from the affected municipal supply wells. Currently, the plume is known to be at least 8,000 feet long and approximately 2,000 feet wide, and extend vertically from the water table to the depth of the water supply wells.

The MCL is exceeded in one municipal supply well and 14 monitor wells, based on analytical data collected by the NMED Superfund Oversight Section, the CLC, and The NMED Drinking Water Bureau. Of the wells sampled, PCE concentrations ranged from non-detect to 53 ug/L (this high concentration was detected in monitor well MW-SF3). The PCE concentrations appear to be stable over time in some wells and increasing with time in others. Low concentrations of 1,2-dichloroethane (1,2-DCA), at MW-1 (at the DACTD facility), and trichloroethene (TCE), in MW-SF10, were detected during the July 2000 sampling event (both 1,2-DCA and TCE are degradation products of PCE). No other PCE-related VOCs have been detected. Currently, exposure through ingestion of the groundwater is the only known exposure pathway potentially affected by the contamination (**EPA, 2000b**), although there may also be some potential for exposure to PCE in soil vapor at the DACTD maintenance yard. The PCE in soil vapor at the DACTD maintenance yard is due to a currently unidentified surface source, and is not a result of soil vapor migration from the affected groundwater that occurs at about 180 feet beneath the yard.

1.1.4 Site Environmental Setting

This section describes physical characteristics of the site vicinity in terms of potential pathways. This information has been compiled from the HRS Documentation Record (**EPA, 2000b**).

Regional Geology. Las Cruces is located in the Mexican Highlands section of the Basin and Range physiographic province. In general, the physiography of the area consists of uplifted fault-block mountain ranges and intermontane basins. The intermontane basins are structurally depressed areas that have been displaced downward with respect to the mountains. The mountain ranges and intermontane basins generally have a north-south trend. Other mountain types in the area include broad domal uplifts and erosional remnants of igneous intrusive bodies. The major physiographic features in the Las Cruces area are the entrenched Rio Grande and two intermontane basins, the Jornada del Muerto and the Mesilla Bolson. The City of Las Cruces is located in the Mesilla Valley (located within the Mesilla Bolson) east of the Rio Grande. The Jornada del Muerto is located north and east of Las Cruces (**King, et al., 1971**).

The regional geology is comprised of the Quaternary flood plain alluvium and the Miocene to Middle Pleistocene Santa Fe Group. The flood plain alluvium was deposited by the Rio Grande. It generally consists of a thick basal sand and gravel channel unit overlain by finer-grained flood plain deposits. The

unit is generally about 4 miles wide and 80 feet thick. The Santa Fe Group is a rock stratigraphic unit composed of sequences of unconsolidated to moderately consolidated sedimentary deposits, some basalts, and minor ash-fall deposits that have partially filled the intermontane basins along the Rio Grande depression from the San Luis Valley of Colorado to the lower El Paso Valley of Texas and Chihuahua, Mexico. The Santa Fe Group can be up to 4,000 feet thick (**Frenzel, et. al, 1990**).

Regional Hydrogeology. The regional hydrogeology is largely controlled by the structure of the geology. Groundwater basins are situated in the intermontane basins between the uplifted fault-block mountain ranges. The major groundwater basins in the Las Cruces area are the Mesilla Groundwater Basin and the Jornada del Muerto Groundwater Basin. Las Cruces is located within the Mesilla Groundwater Basin, and the Jornada del Muerto Basin is further to the north and east. The two basins are separated by a subsurface high in the less permeable bedrock (**King, et al., 1971**).

The Rio Grande flood plain alluvium and the Santa Fe Group are the two major groundwater reservoirs in the area. In the Mesilla Groundwater Basin, the two units form a complex aquifer system. Groundwater recharge is primarily from the Rio Grande into the flood plain alluvium. The groundwater then migrates downward through the shallow alluvium to the upper Santa Fe Group through a series of interconnected gravel, sand, and clay lenses. Vertical flow within the system is restricted by thin, interbedded clay lenses in the lower part of the flood plain alluvium and the upper portion of the Santa Fe Group. This vertical heterogeneity results in the horizontal permeability generally exceeding the vertical permeability by several orders of magnitude. Groundwater occurs under unconfined conditions within the flood plain alluvium and under unconfined to semi-confined conditions within the Santa Fe Group. Groundwater flow within the Mesilla Groundwater Basin is generally to the southeast (**King, et al., 1971**).

The Mesilla Groundwater Basin aquifer has excellent recharge, transmission, and storage capacity. These characteristics make the aquifer system capable of producing large quantities of high quality water for agricultural, municipal, and industrial uses. The aquifer is the only source of water for the City of Las Cruces. The CLC Municipal Water System is a blended system supplying water from 28 wells to approximately 67,900 people. The well field is located on the east side of the Rio Grande within inter-tonguing sand and gravel layers in the Santa Fe Group. No single well supplies more than 40% of the

total water within the system, and the system produces on average approximately 8 million gallons per day (**EPA, 2000b**).

Site Hydrogeology. In the vicinity of the GWP site, groundwater occurs under unconfined conditions in unconsolidated to semi-consolidated fine sands with some gravel and clay. The aquifer is within the Santa Fe Group. Groundwater flow is typically towards the east, and the depth-to-water is approximately 185 feet bgs (as measured at the DACTD maintenance yard) (**EPA, 2000b**).

Climate. Surface water in the Las Cruces area is very limited. The climate in the area is arid. In the Mesilla Valley, temperatures reach 90° F or greater an average of 101 days a year. In January, the coolest month, the average daily maximum temperature is 57° F and the average daily minimum temperature is 25° F. Precipitation amounts in the valley range between 8.0 and 9.0 inches per year, with most precipitation being in the form of rain. Most rain is limited to brief, intense thunderstorms that occur between July and September. Potential evaporation and transpiration greatly exceeds rainfall. Potential evaporation rates measured in an evaporation pan average about 97 inches per year. Potential evaporation and transpiration rates limit the amount of surface water available in the area. This also limits the amount of recharge the aquifer receives from rainfall (**King, et al., 1971**).

1.2 Overview and Focus of RI/FS Field Activities

The purpose of the RI/FS is to determine the nature and horizontal and vertical extent of the groundwater plume associated with the GWP Site. The site conceptual model, the data quality objectives, and an overview of the RI/FS tasks is described in the Technical Activities Work Plan (**CH2M HILL, 2002a**). This Field Sampling Plan, a component of the Sampling and Analysis Plan for the investigation, details the specific field activities to be conducted. These field activities include collection of soil vapor, soil, and groundwater sample analytical data through the use of direct push technology (DPT) and conventional drilling. New monitor wells will be installed at locations appropriate for evaluating the horizontal and vertical extent of the plume, and for evaluating potential source areas. The relationship of the contamination detected in Well No. 24 to the GWP site will also be evaluated.

The Quality Assurance Project Plan (QAPP) (provided under separate cover), describes the policy, organization, functional activities, and quality assurance/quanity control (QA/QC) protocols necessary to achieve the data quality objectives (DQOs) determined for the investigation (**CH2M HILL, 2002c**). The FSP and the QAPP together comprise the Sampling Analysis Plan (SAP) for this RI/FS. Health and safety procedures are defined in the Health and Safety Plan (HSP) (**CH2M HILL, 2002b**), also provided under separate cover. Additional details of supporting activities performed by subcontractors, such as drilling, soil gas sampling, and laboratory analysis, will be found in subcontract procurement documents, provided under separate cover.

1.3 Project Schedule

The overall schedule for the field activities is described in the Work Assignment Work Plan for this investigation (**CH2M HILL, 2001**). Refinements to the schedule are likely and will be communicated by the project manager (PM) to the field team via project instruction updates.

1.4 Project Team

Figure 1-4 illustrates the project team organization. Descriptions of the various roles and responsibilities may be found in the QAPP.

1.5 Plan Organization

Provided in **Section 2** of this Work Plan is an overview of the field investigation objectives. **Section 3** summarizes the field support activities. The soil, soil vapor, and hydrogeologic investigation activities are specified in **Section 4**. **Section 5** describes sample handling and analysis procedures. **Section 6** provides the Data Management Plan (DMP). **Section 7** describes procedures for decontamination and investigation-derived waste handling. References are listed in **Section 8**. Refer to the Technical Activities Work Plan (**CH2M HILL, 2002a**) for more detail regarding the site background, setting and investigation objectives, and to the QAPP for details regarding quality assurance and quality control (**CH2M HILL, 2002c**). The SMP describes site management procedures (**CH2M HILL, 2002d**), and the HSP describes health and safety procedures (**CH2M HILL, 2002b**).

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Table 1-1

PCE Concentrations in Wells Located in the Vicinity of the Griggs and Walnut Groundwater Plume Site

Griggs and Walnut Avenue Groundwater Plume Site

Las Cruces, New Mexico

Well ID	Aug-93	Feb-94	Jun-94	Oct-94	Jan-95	Feb-95	Apr-95	Jun-95	Aug-95	Oct-95	Jan-96	Feb-96	Apr-96	Jul-96	Jan-97	Jul-97
Well 10								ND								
Well 18					32.0	1.5	0.5		0.6	ND	6.4	0.8	0.8	1.0		
Well 19		0.3	0.3	ND	ND		ND		ND	ND	0.6					ND
Well 21	0.9	0.8	1.0	1.0	0.7		1.3		1.2	1.2	1.1				1.3	
Well 24																
Well 27	1.4		0.7	0.6				0.8	ND	0.8		1.0				1.8
Well 54					ND								ND			
Paz Park																
LRG-3191																
LRG-7375																
Shook																
MW-1*																
MW-2*																
MW-3*																
MW-4*																
MW-5*																
MW-6*																
MW-SF1																
MW-SF2																
MW-SF3																
MW-SF4																
MW-SF5																
MW-SF6																
MW-SF7																
MW-SF8																
MW-SF9																
MW-SF10																
MW-1#																
MW-2#																
MW-3#																
MW-4#																
MW-5#																
MW-6#																
MW-7#																
MW-8#																

units - ug/L
blank - not sampled
ND - non-detect
J - estimated concentration
* - Well Located at the DACTD Transportation Yard
# - Well Located at the Former Circle K Store #1306
**- Two samples collected, result is the average value of the two.

Table 1-1

PCE Concentrations in Wells Located in the Vicinity of the Griggs and Walnut Groundwater Plume Site

Griggs and Walnut Avenue Groundwater Plume Site

Las Cruces, New Mexico

Well ID	Jan-98	Mar-98	Apr-98	May-98	Jun-98	Aug-98	Dec-98	Mar-99	Jul-99	Mar-00	Apr-00	Jul-00	Mar-01	Jun-01
Well 10									ND					
Well 18			15.0		18.0				20.1		7.0	47.0 (J)		
Well 19			1.1		0.8 (J)				1.2					1.4
Well 21			2.0		2.0				2.3		2.0			3.4
Well 24														1.5
Well 27			1.4		2.0				4.5		4.0			4.5
Well 54									ND		ND			
Paz Park			ND		ND				ND					
LRG-3191		1.0			0.9									
LRG-7375	ND				ND									
Shook				15.0	17.0				11.0					
MW-1*			3.0			4.4	ND	1.6	3.0			7.0		
MW-2*		52.0	23.0			35.0	40.0	44.0	40.0	26.0		32.0		
MW-3*		20.0	15.0			10.0	11.0	21.0**	22.0	24.0		14.0 (J)		
MW-4*		8.1	9.0						7.0	5.0		5.0		
MW-5*		2.3	3.0			2.5	1.0	0.5	3.0	6.0		8.0		
MW-6*		ND	3.0			1.4	1.1	1.5						
MW-SF1										52.0		41.0 (J)		
MW-SF2										42.0				
MW-SF3										43.0		53.0		
MW-SF4										19.0		17.0		
MW-SF5												7.0		
MW-SF6												3.0		
MW-SF7												13.0		
MW-SF8												13.0		
MW-SF9												ND		
MW-SF10												31.0		
MW-1#													ND	
MW-2#													ND	
MW-3#													ND	
MW-4#													ND	
MW-5#													ND	
MW-6#													ND	
MW-7#													ND	
MW-8#													ND	

units - ug/L
blank - not sampled
ND - non-detect
J - estimated concentration
* - Well Located at the DACTD Transportation Yard
# - Well Located at the Former Circle K Store #1306
**- Two samples collected, result is the average value of the two.

N

1000 0 1000 2000 3000 Feet

Legend

- Interstate Highway
- City of Las Cruces (CLC) Supply Wells

GWP_FSP_Ver1.1_Figure1-1.pdf

CH2MHILL

Figure 1-1
Site Location Map
Griggs & Walnut Ground Water Plume Site
Las Cruces, New Mexico

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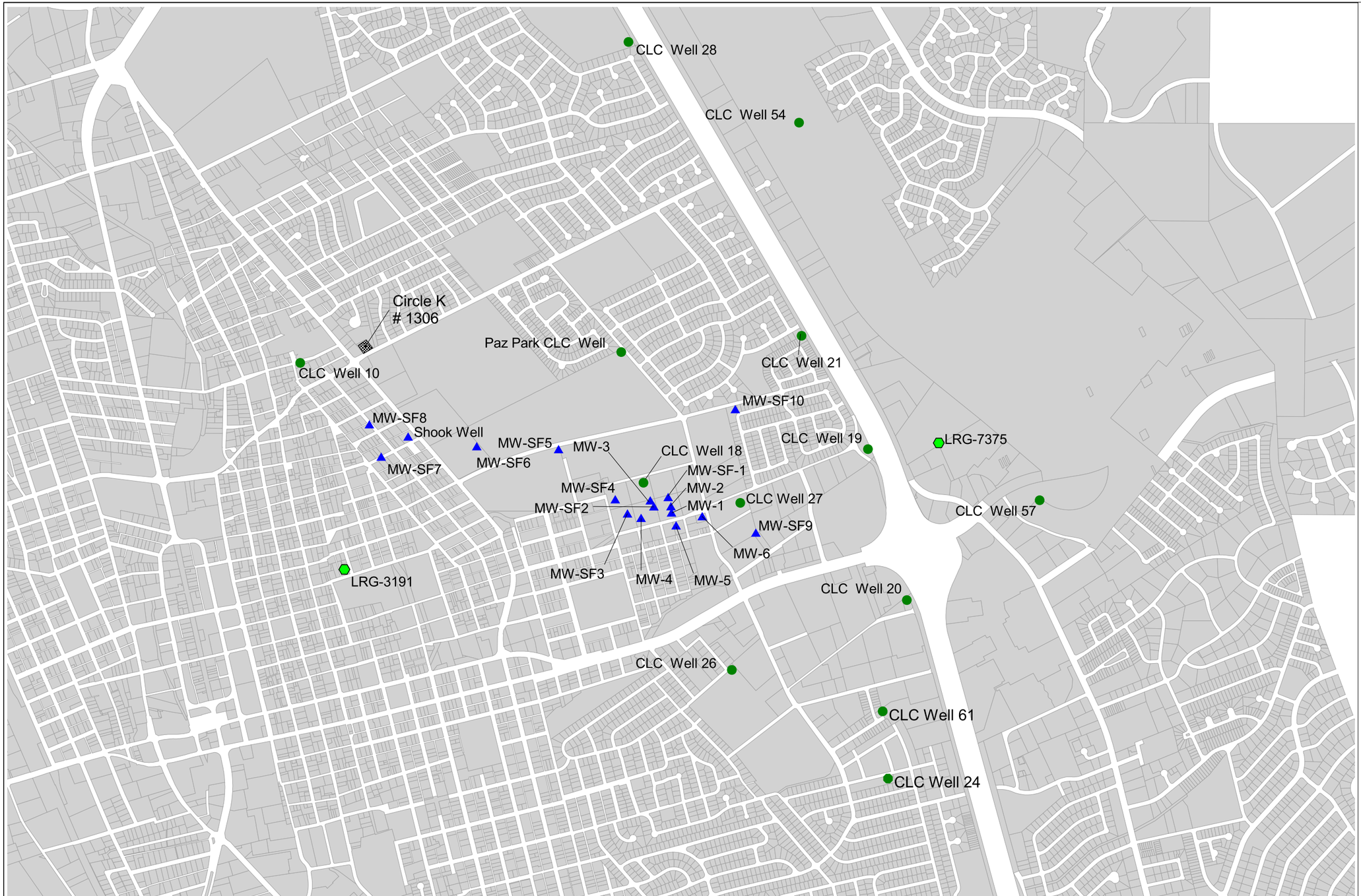

Legend

- Monitor Wells
  (Screen Intervals Range From 3867 to 3827 MSL)
- Private Wells
- City of Las Cruces (CLC) Supply Wells
  (Screen Intervals Range From 3730 to 3325 MSL)

GWP_FSP_Ver1.1_Figure1-2.pdf

Figure 1-2

Well Location Map

Griggs & Walnut Ground Water Plume Site

Las Cruces, New Mexico

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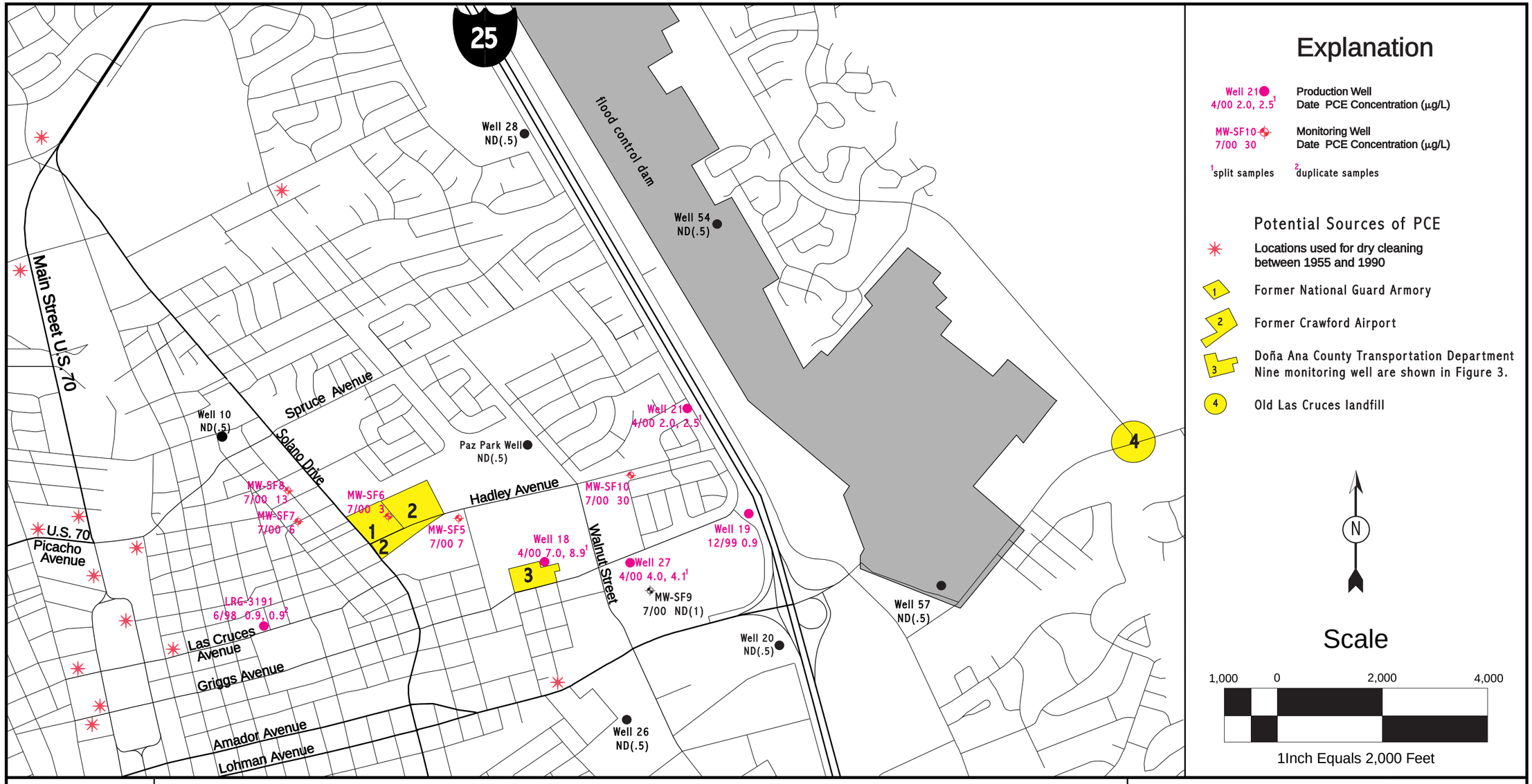

Explanation

Well 21 ● 4/00 2.0, 2.5[1] — Production Well, Date PCE Concentration (µg/L)

MW-SF10 ◈ 7/00 30 — Monitoring Well, Date PCE Concentration (µg/L)

[1]split samples [2]duplicate samples

Potential Sources of PCE

✳ Locations used for dry cleaning between 1955 and 1990

1 Former National Guard Armory

2 Former Crawford Airport

3 Doña Ana County Transportation Department
Nine monitoring well are shown in Figure 3.

4 Old Las Cruces landfill

N

Scale

1,000 0 2,000 4,000

1Inch Equals 2,000 Feet

Figure 1

Production wells, monitoring wells, and potential sources of tetrachloroethene in Las Cruces, New Mexico.

Ground Water, Griggs and Walnut Site, CERCLIS Number: NM0002271286

Drawn by: christopher holmes 10/2000

New Mexico Environment Department
Ground Water Quality Bureau
Superfund Oversight Section

Figure 1-3
Locations of Potential Sources of PCE (Reproduced from NMED Figure)
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

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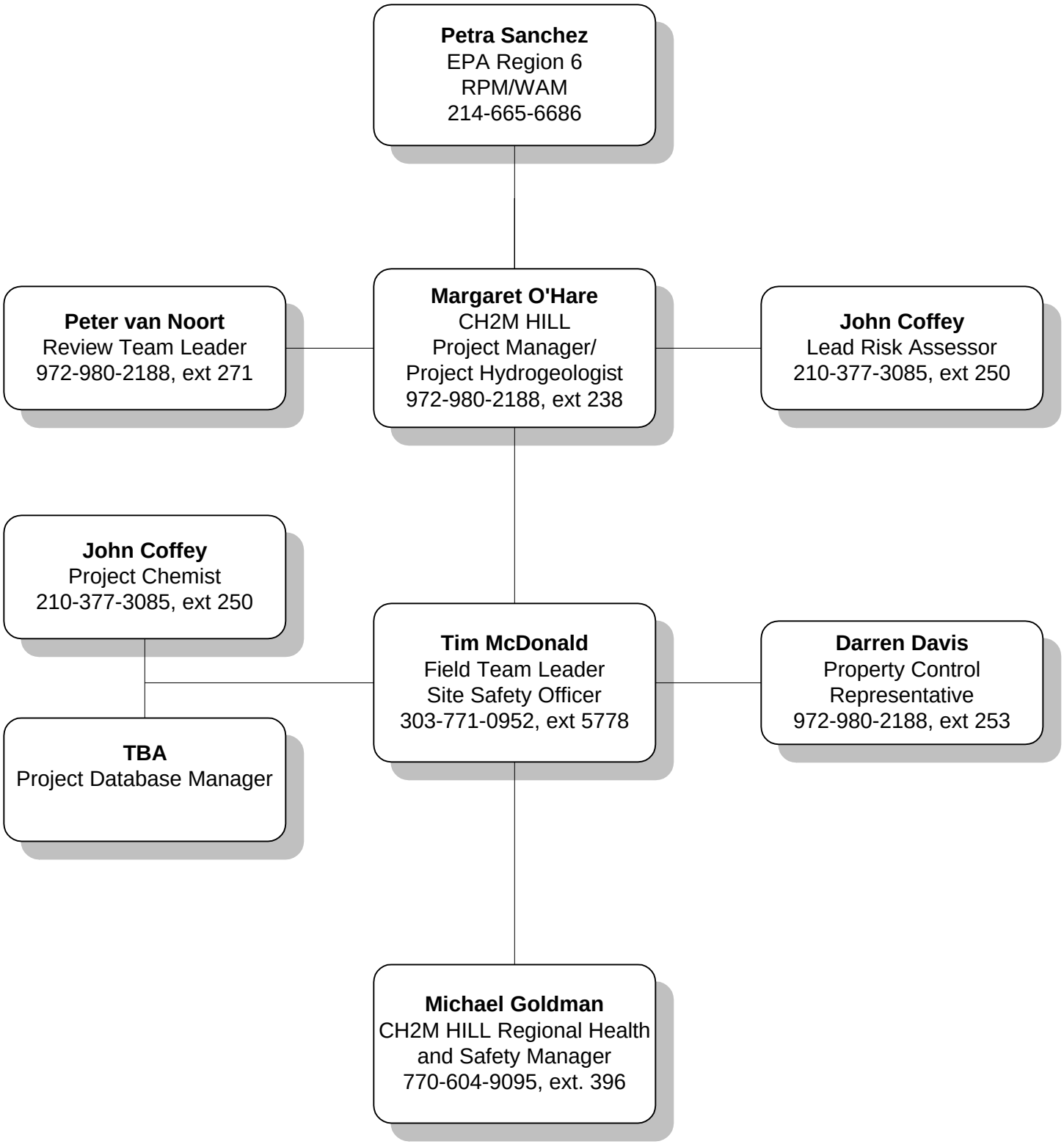
Figure 1-4
Project Team Organizational Chart
Griggs and Walnut Groundwater Plume Site
RI/FS



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Section 2
Field Investigation Objectives

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Section 2

Field Investigation Objectives

During the development of the TAWP (**CH2M HILL, 2002a**), available information for the site was reviewed and used to develop both project objectives and DQOs. These objectives were used as the basis for development of the field activities described herein.

2.1 Project Objectives

The following project objectives were developed during the development of the TAWP:

- Evaluate the extent of contamination in the subsurface.
- Investigate the possible sources of contamination.
- Characterize the risk to human health posed by site contaminants.
- Develop sufficient data needed to identify and evaluate potential remediation alternatives.

These project objectives have been used to develop specific DQOs that describe the type and quality of data needed to support future decisions regarding remedial actions at this site. These DQOs provide a basis for the RI/FS activities to be performed, and ensure that data collected during the RI/FS will be of sufficient and adequate quality for their intended use. EPA guidance on the DQO process has been utilized in developing these initial DQOs (**EPA, 2000a**).

2.2 Data Quality Objectives

The first step in the DQO process includes evaluating available information for the site and identifying data gaps so that RI/FS objectives and decisions can be delineated. Data available from the FSI and other investigation activities conducted near the site provide a basis for development of the DQOs.

The next steps in the DQO process involve establishing the specific types of data needed to meet the project objectives, including the number and locations of samples to be collected and the level of QA/QC. The specific RI/FS activities are identified and described based on the type of data to be collected. The DQOs established for the GWP RI/FS at this time are presented in **Table 2-1.**

2.3 Field Activity Summary

The sequential field investigation activities identified to address the general project objectives and DQOs are summarized in **Table 2-2.** The two main aspects of the work will be a unsaturated zone soil vapor investigation and a hydrogeologic investigation. The unsaturated zone investigation will include surface and subsurface soil sampling, soil vapor sampling with DPT, and multilevel soil vapor well installations with followup soil vapor sampling. The hydrogeologic investigation will include new monitor well installations, groundwater sampling, and aquifer testing. Other related support activities include surveying, layout of sample locations, and mobilization/demobilization activities. Support activities are discussed in **Section 3**. Vadose zone investigation activities and hydrogeologic investigation activities are discussed in **Section 4**.

Table 2-1 Data Quality Objectives			
Media of Interest	**Data Quality Objective**	**RI/FS Activity**	**Analytes**
Surface soil (0 to 6 inches bgs)	In areas where PCE is detected in shallow subsurface soil vapor, confirm presence/absence of surface soil contamination as a potential secondary source, sufficient to support risk-based decision regarding necessary response actions	• Grid sampling of surface soil for PCE and related constituents. • Measure parameters necessary to evaluate potential response actions. • Collect data adequate to support performance of human and ecological risk assessments.	• Volatile Organics • Physical soil parameters[1]

Table 2-1 Data Quality Objectives			
Media of Interest	**Data Quality Objective**	**RI/FS Activity**	**Analytes**
Soil vapor (vadose zone - 0 to approximately 200 feet bgs)	In areas where PCE is detected in shallow subsurface soil vapor, confirm presence/absence of soil vapor contamination as a potential secondary source and exposure pathway, sufficient to support risk-based decision regarding necessary response actions	• Grid sampling of horizontal and vertical extent of subsurface soil vapor for PCE and related constituents (note: sampling of soil vapor will be conducted in potential source areas if determined to be warranted based on the horizontal and vertical plume definition). • Measure parameters necessary to evaluate potential response actions. • Collect data adequate to support performance of human and ecological risk assessments, using existing data as appropriate to reduce RI data collection.	• Volatile Organics

Table 2-1
Data Quality Objectives

Media of Interest	Data Quality Objective	RI/FS Activity	Analytes
Subsurface soil (6 inches to approximately 200 feet bgs)	In areas where PCE is detected in shallow subsurface soil vapor, confirm presence/absence of surface soil contamination as a potential secondary source, sufficient to support risk-based decision regarding necessary response actions	• Sampling of subsurface soil via direct push (grab) and conventional drilling methods, for both organic and inorganic contamination • Sampling of any non-aqueous phase liquid found, to support future decisions regarding remedial options • Characterize subsurface stratigraphy • Measure parameters necessary to evaluate potential remedial action alternatives • Collect adequate data to perform human health and ecological risk assessments	• Volatile Organics • Inorganics • Physical soil parameters[1] • Chemical and physical characteristics of NAPL[3]
	Above areas where PCE is detected in groundwater and where a source is suspected in overlying soils based on either soil or soil vapor results, confirm presence/absence of PCE in subsurface soil as a potential continuing secondary source to groundwater, sufficient to support risk-based decision regarding necessary response actions.		

Table 2-1
Data Quality Objectives

Media of Interest	Data Quality Objective	RI/FS Activity	Analytes
Groundwater (below water table - below approximately 200 feet bgs)	Confirm horizontal and vertical extent of PCE in groundwater sufficient to make risk-based decision regarding necessary response actions.	• Characterize deeper aquifer conditions via existing onsite water supply and monitoring wells and available logs, and new wells. • Measure parameters necessary to evaluate potential remedial action alternatives • Collect adequate data to perform human health and ecological risk assessments • Sample any non-aqueous phase liquid found, to support future decisions regarding remedial options	• Volatile Organics • Water quality parameters[2] • Chemical and physical characteristics of NAPL[3] • Physical characteristics of aquifer
	Characterize local aquifer properties and flow conditions sufficient to support evaluation of fate and transport of the PCE contamination, sufficient to allow risk-based decisions regarding necessary response actions.	• Geophysical logging to assess deeper aquifer stratigraphy • Aquifer testing to evaluate groundwater flow conditions and contaminant fate and transport with the aquifer • Computer modeling to evaluate groundwater flow conditions, contaminant fate and transport, and to evaluate potential remedial action alternatives.	

Notes:
1. Physical soil/sediment parameters include TOC, pH, grain size, permeability, toxicity, percent moisture, and oil & grease.
2. Water quality parameters include TOC, pH, total dissolved solids, alkalinity, dissolved oxygen, total hardness, and major cations/anions.
3. Chemical/physical parameters of NAPL include BTU, pH, liquid content, ash content, viscosity, density, and organic/inorganic components.

Selection of initial sample locations is based on the need to confirm plume extent. Once the plume extent has been verified, investigations into potential sources will be more effective.

Table 2-2
Sequential Remedial Investigation Field Activities
Griggs and Walnut Groundwater Plume Site - RI/FS

Sequential Activity		Prerequisite Field Activities[1]	Dependent Field Activities[2]	Schedule for Beginning Ongoing Activities
1	Water well database search - database search will be performed to identify wells within the study area for potential sampling. Permission will be secured to visit wells. CERCLIS and RCRIS database search - database search will be performed to identify other potential sources of contamination.			
2	Preliminary utility survey - prior to the site reconnaissance, Blue Stake will be contacted and provided with locations of nearest street corners and intersections adjacent to proposed drilling sites. A map showing proposed drilling locations will be provided to the City of Las Cruces.		3	
3	Site Reconnaissance - kick off meeting, water well survey, initial survey, initial sample location survey, and building and construction survey.	6[4]	5, All drilling activities	
4	Mobilization (field trailer brought to site, phone and electrical hookups, equipment shipped to site, set-up of IDW staging area).	3	All subsequent activities	Initiate field property management / purchase / control procedures initiated.
5a	Water table monitoring well installations - Up to 22 wells will be installed. Installations will take place over several mobilizations. This activity includes drilling, well installation, and well development.	4	6a	

Table 2-2
Sequential Remedial Investigation Field Activities
Griggs and Walnut Groundwater Plume Site - RI/FS

Sequential Activity		Prerequisite Field Activities[1]	Dependent Field Activities[2]	Schedule for Beginning Ongoing Activities
5b	Water table monitoring well sampling - Each newly installed well will be sampled after development for VOCs.	4	6a, 7b	Samples will be submitted for rapid turn-around-time to facilitate decision making in the field for future well locations.
6a	Water FLUTe multilevel sampling system installation - Up to 5 nested monitoring wells will be installed below the water table. This activity includes drilling, well installation, and well development.	5a, 5b	6b	
6b	Water FLUTe sampling - Each newly installed nested well will be sampled after development for VOCs.	5a	5a	Samples will be submitted for rapid turn-around-time to facilitate decision making in the field for future well locations and screen intervals.
7a	Direct-Push shallow soil investigation at the DACTD maintenance yard. Includes drilling, soil vapor sampling, and analysis onsite.	4	8a	
7b	Direct-push shallow soil investigation at other potential source areas identified through groundwater sampling results. Includes drilling, soil vapor sampling, and analysis onsite.	5c	8a	

Table 2-2
Sequential Remedial Investigation Field Activities
Griggs and Walnut Groundwater Plume Site - RI/FS

Sequential Activity		Prerequisite Field Activities[1]	Dependent Field Activities[2]	Schedule for Beginning Ongoing Activities
8a	Soil vapor monitor well cluster installation - includes drilling, potential soil sampling, and well installation. Installations may occur over several mobilizations, separated by soil vapor sampling. After initial installations, sampling results will be used to place/design additional wells.	4, 7a, 7b	8b	
8b	Soil vapor sampling via onsite laboratory - approximately 60 soil vapor samples will be collected and analyzed for VOCs. Approximatly 10% of the samples will be sent offsite for confirmatory analysis	4, 8a	9	
9	Subsurface soil sampling - includes drilling and collection of subsurface soil samples. Samples will be analyzed for VOCs at an offsite laboratory. This task will be performed only if deemed necessary based on soil vapor sampling results.			
10a	Groundwater sampling (Round 1 - all newly installed and existing wells) - wells will be sampled and analyzed for VOCs.	5a, 6a	12	Groundwater sampling may occur no sooner than one week after last well is installed and purged.
10b	Aquifer testing.	8c		Concurrent with 10a.
11	Surveying - all newly installed wells, some existing wells, direct-push locations, and subsurface soil sampling locations will be surveyed. Surveying will take place in at least three events, once after shallow well installations, after nested well installations, and after all drilling activities are completed.	5a, 6a, 7a, 7b, 8a, 8b, 9		

Table 2-2
Sequential Remedial Investigation Field Activities
Griggs and Walnut Groundwater Plume Site - RI/FS

Sequential Activity		Prerequisite Field Activities[1]	Dependent Field Activities[2]	Schedule for Beginning Ongoing Activities
12	Demobilization and IDW disposal.	All activities except 13.		
12	Groundwater sampling (Round 2 - all wells).	10a		Can begin one month after 10a

Notes:
1. Prerequisite activities are those that must be completed before the subject task can begin.
2. Dependent activities are those that cannot be initiated until the subject activity is complete.
3. a, b, c, d, refer to activities occurring under similar mobilization event.
4. Building and construction survey will be performed following review of analytical results from Activity 8b.

Section 3
Support Activities

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Section 3

Support Activities

Several field activities will be conducted in support of the sampling activities. The following paragraphs provide details regarding these activities, planned for completion prior to or subsequent to the majority of soil and groundwater sampling activities. These activities include site reconnaissance, mobilization, and demobilization. Property control is also addressed, which will occur throughout the field investigation.

3.1 Site Reconnaissance

The site reconnaissance will include a water well survey, utility survey, initial groundwater monitoring well location survey, and a building and construction survey. Most of these activities include both an office component and field component. The office component of the activities will be completed prior to the actual site reconnaissance. The field component of each activity will occur during the first shift at the beginning of the field investigation, expected to last approximately 7 days. The PM, field team leader (FTL), and assistant FTL will participate in these activities, which will occur prior to and co-incident to the field mobilization (**Section 3.2**). Additional description of the activities is provided below.

3.1.1 Water Well Survey

A water well survey consisting of several supplemental tasks will be conducted. These tasks will include: 1) performing a water well database search; 2) performing a search of the CERCLIS and RCRIS databases to determine if other as yet unidentified potential sources exist; 3) performing a search of NMED's USTB files for potential locations of additional monitor wells; 4) obtaining offsite property access; 5) conducting a well inspection; 6) collecting water level measurements, and 7) developing recommendations for wells that should be considered for sampling, and for appropriate sampling methods.

The locations of the wells identified through NMED's investigation are shown on **Figure 1-2**. Six monitoring wells were installed at the DACTD maintenance yard as part of the LUST investigation. The NMED Superfund Oversight Section installed an additional 10 wells at and near the DACTD facility. All of the wells were sampled as part of the NMED's investigation. Also, other wells at or near the site that have been sampled by the City or NMED include CLC Wells Nos. 10, 20, 24, 26, 28, 54, 57, 61, and

the CLC Paz Park well. Also, two private wells, LRG-3191 and LRG-7375, and the monitoring well at the Gas Card site (Shook Well) have been sampled as part of the NMED investigation. Included on **Figure 1-2** are approximate locations of most of these wells. The locations of businesses identified by NMED as possibly handling PCE during their operation is shown on **Figure 1-3**.

To identify the specific locations of all existing water supply wells and groundwater monitoring wells in the vicinity of the PCE plume, a records search of the New Mexico Office of the State Engineer database and the NMED's USTB database will be performed. The search will identify any wells within the known area of the plume and wells one mile up and down-gradient of the known area of the plume and identify available records regarding construction details. This information will be evaluated prior to the first shift of the field work to determine whether any wells listed should be considered for sampling. The PM will be provided with a list of owners that should be contacted to request permission for inspection and possible sampling of the wells on their property. The PM will request permission to access these wells through the EPA prior to initiating any field work.

At those wells for which access permission has been obtained, direct inspection of the wells will take place and the owner or operator interviewed. The following information will be obtained during the inspection and interview:

- Location of well (the well may be surveyed later in the investigation).
- Owner.
- History (date drilled, down-hole maintenance, pump information, operational history).
- Current use (abandoned, irrigation, industrial, or domestic?).
- Condition (accessibility? Can the well be sampled via existing pump?).
- Construction (casing and screen size, depth, screen interval, pump type/size).

This information will be documented in a field notebook and used as the basis for selection of sample locations described in **Section 4.4**.

3.1.2 Initial Utility Survey

During this survey, Blue Stake, a firm representing the consortium of utility companies (electric, gas, telephone), will be contacted and provided with descriptions of preliminary drilling locations so that they may delineate subsurface utilities operated by consortium members. The City's Director of Water Resources Department will be provided a map showing proposed initial drilling locations. Both of these activities will be completed at least 3 days prior to the site reconnaissance. Also, a utility survey will be conducted for the initial soil vapor survey points at the DACTD maintenance yard. The proposed initial soil vapor survey grid areas are shown on **Figure 4-1**, and initial well locations are shown on **Figure 4-2**.

3.1.3 Initial Groundwater Monitor Well & Soil Vapor Monitoring Point Location Survey

As part of the site reconnaissance, the FTL will conduct a survey of proposed monitor well drilling locations with site representatives and any EPA representatives that are present. The purpose of the survey will be to allow the field team to become familiar with proposed drilling locations, verify that locations are accessible, identify visual indications of subsurface utilities, and identify any health and safety issues that may be present at each location. Public utilities marked by Blue Stake during the utility survey will also be noted. It is assumed that access agreements will already be in place. If a sample location is inaccessible for some reason, alternative locations may be chosen in the field upon consultation with the PM. Observations during the survey will be documented in the field notebook and on a sample location survey form (contained in **Appendix A**).

Also, as part of the site reconnaissance, a survey will be conducted of the proposed soil vapor monitoring point drilling locations at the DACTD maintenance facility. This survey will be conducted in a similar manner to the survey for the monitoring wells. Access for field activities at the DACTD facility has already been obtained by the EPA. At this time, the DACTD maintenance facility is the only location within the known boundary of the plume where the use of PCE has been documented, and the presence of PCE contamination has been documented in soil vapor samples and a surface water sample. Other facilities located in the area, including the former National Guard Armory, the former Crawford Airport, and the City's Fleet Maintenance yard, will be investigated as more information becomes available. A

similar reconnaissance and survey will be conducted for any future additional monitor well locations and soil vapor sampling locations.

3.1.4 Building and Construction Survey

For risk assessment purposes when soil vapor contamination is an issue, a survey of buildings and dwellings in the area is typically conducted to evaluate the possibility for migration pathways through basements or other subsurface structures. For this site, the only area demonstrating soil vapor contamination is the DACTD maintenance yard. During the site reconnaissance, the FTL will interview City representatives and visually survey buildings and dwellings at the yard for the types of foundation construction as well as property use. The presence or potential presence of basements and other subsurface building structures will be noted. If soil vapor is found during the investigation to exist other than at the DACTD yard, this survey may be expanded.

3.2 Mobilization/Demobilization

In preparation for the field investigation task, procurement of equipment and supplies, including power and phone connections, will be initiated offsite several weeks prior to the start of the investigation. Onsite mobilization includes identification and delineation of a sampling equipment staging area and an IDW staging area. The task will also include the setup of a field trailer, including fax, phone, computer, and electrical connections, a rest room facility, and a potable water container. At the completion of the field investigation task, demobilization activities will be performed. These activities will include restoration of the site to a standard determined by its prior condition, preparation of a description of access procedures for any facilities remaining onsite, removal of all temporary facilities, and disposition of all project-acquired and leased materials and equipment as required under the CH2M HILL property management guidelines (described in **Appendix B**).

3.3 Property Control

Property management provides for the procurement and management of property during the field investigation in accordance with the property management contractual requirements specified in FAR 52-

245-5 and applicable EPA property regulations, including consumables and equipment. Property control guidelines were prepared by CH2M HILL for government contracts (**Appendix B**). The property control representative (PCR) will utilize these management guidelines to track the cost, purchase, receipt, and maintenance of all government-owned and leased material acquired during the project. The PCR will provide regular updates to the PM regarding the status of government property and will communicate as needed with CH2M HILL's corporate government property administration.

3.4 Surveying

Surveying of the newly installed groundwater wells and soil vapor monitoring points will be subcontracted to a licensed surveyor in the State of New Mexico. Existing wells that are utilized for the sampling effort will also be surveyed if they have not been surveyed previously. The licensed surveyor will locate all wells and establish horizontal and vertical control relative to a local datum. Surveying will take place in about two mobilizations, the first after the completion of the initial monitor well installations, and the second following completion of the additional groundwater monitor well installations, soil vapor investigations, and any potential subsurface soil sampling.

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Section 4
Field Investigation Activities

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Section 4

Field Investigation Activities

The field investigation will include collection and analysis of soil vapor samples at the DACTD maintenance yard, collection and analysis of surface and subsurface soil samples, collection and analysis of groundwater samples through new and existing monitoring wells, and performance of aquifer testing in new and existing monitor wells. The procedures for these investigations are described in the following paragraphs. Analyses will be focused on the detection of PCE and its degradation products (volatile organic compounds).

4.1 Soil Vapor Investigation

Soil vapor in the shallow subsurface at the DACTD maintenance yard was previously determined to be affected with PCE in a DPT investigation that collected samples up to 8 feet bgs. For the RI, a deeper and more focused sampling effort will be conducted on a grid in areas previously identified as demonstrating the presence of PCE in soil vapor. Other locations for soil vapor investigations will be chosen based on the results of groundwater monitoring data, and the identification of locations where PCE could have been potentially used. The number and types of samples are listed in **Table 4-1.** The following paragraphs describe the individual components of the soil vapor investigation.

4.1.1 Direct Push Soil Vapor Study

Following the site reconnaissance, a direct push rig will be used to sample soil vapor in the shallow unsaturated zone at approximately 25 to 30 points at the DACTD maintenance yard. The focus of the investigation will be two areas previously identified as demonstrating the presence of PCE in soil vapor: (1) the paint storage area in the northeast corner of the yard; and (2) the drum storage area in the northwest corner of the yard (the previous investigation sampled to 8 feet bgs). These areas are illustrated in **Figure 4-1**; the exact area to be sampled may be refined based on the initial site reconnaissance. At each location, the DPT tool will be pushed to 20 feet bgs or until refusal. In addition, an attempt will be made to push to 50 feet bgs at two locations (one in each area described above) to permit analysis of soil vapor at depth. Soil vapor samples will be collected at 5 ft intervals at each location (see **Section 4.1.2** for more information about the analysis). Locations may be adjusted in the field based on the analytical results of the soil vapor analyses.

In addition to the initial soil vapor survey at the DACTD facility, additional soil vapor investigations may be conducted in this manner if groundwater data suggests that other potential source areas are present, and the suspected source of contamination can be identified.

Soil vapor samples will be collected at 5 ft intervals down to 20 feet bgs at 23 to 28 locations and at five ft intervals down to 50 ft bgs at two locations. The soil vapor samples collected with the DPT will be analyzed onsite in the DPT rig by the DPT subcontractor. A maximum of approximately 132 samples will be collected in this manner for soil vapor analysis. Approximately 13 additional samples (10%) will be collected via Summa canisters for offsite confirmation analysis. All subcontracted drilling and sampling work will be overseen by the FTL or other field team member. Results from the soil vapor sampling will be provided to the FTL and PM by the subcontractor. The soil vapor analyses will be used in real-time to adjust subsequent sampling locations and depths.

4.1.2 Soil Vapor Sampling During Drilling Activities

Within the DACTD maintenance yard, one location will be selected for drilling of a deep boring to characterize the vertical extent of PCE contamination in both soil vapor and groundwater and install a multiple level groundwater sampling system. Drilling activities will be conducted using a drilling method capable of achieving the desired depth of investigation. During the drilling of this first deep well, soil vapor samples will be collected at 20 foot intervals in this hole from 50 feet bgs to the water table, using the SimulProbe tool. The sampling interval may be adjusted based on what is found in the shallow DPT soil vapor investigation.

Based on the results of the soil vapor DPT investigation and the results from the DACTD deep well, and the groundwater monitoring results described in **Section 4.3**, additional locations may be defined for the collection of soil vapor samples during drilling of future monitor wells.

4.1.3 Soil Vapor Monitor Well Installations

If soil vapor is detected during the subsurface soil vapor investigation, soil vapor sampling ports will be installed in the Flexible Underground Liner Technologies (FLUTe) Water FLUTe multi-level water sampling system discussed in **Section 4.3.3**. In addition, conventional soil vapor monitor wells may be installed in areas where additional soil vapor investigation is required and a Water FLUTe is not installed.

The Water FLUTe multi-level sampling system is a unique liner system that is inverted into the borehole. The system can be used for both soil vapor and groundwater sampling. From the water table to the bottom of the borehole, the liner is filled with water, and above the water table, the liner is filled with air. Sampling ports are placed in the liner wall for the collection of depth discrete water and/or soil vapor samples. The wellhead is constructed in a manner that keeps the air in liner above the water table pressurized. The water and the pressurized air inside the liner cause the liner to seal the borehole. The Water FLUTe can be installed in a cased or uncased borehole.

It is assumed that, if necessary, up to five soil vapor sampling ports would be placed in the Water FLUTe in the vadose zone for soil vapor sample collection. The depth of each sampling port will be selected by the PM and FTL following review of geologic logs, photoionization detector (PID) results, and soil vapor results. Each Water FLUTe will be installed in a screened casing. Each sample port will be screened across a unique stratigraphic horizon. It is assumed that the deepest soil vapor sampling port in each Water FLUTe will be near the top of the water table in the vadose zone.

If installed, a conventional well nest will include up to five one-inch wells, each constructed of no less than 1/2-inch Schedule 40 polyvinyl chloride (PVC) well casing and screen. The well screen will consist of 10 feet of 0.020-inch slot, Schedule 40 PVC well screen. Stainless steel centralizers will be attached to the well casing approximately every 50 feet during installation.

The installation depth of each well within a single boring and installation design will be selected by the PM and FTL following review of geologic logs, PID results, and soil vapor results. Each of the wells will

be screened across a unique stratigraphic horizon. It is assumed that the deepest well in each boring will be completed near the top of the water table in the vadose zone.

Gravel pack will be tremmied under pressure around each screened interval, generally extending 5 feet above and below each screen. Gravel pack material will consist of thoroughly washed, hard, durable, siliceous sand. The size of and gradation of the gravel pack, as well as the screen slot size, will be provided in the drilling specifications. Approximately 5 feet of transition sand will be placed above and below each gravel pack to prevent grout from invading the gravel pack material.

Annular seals consisting of granular bentonite (No. 8 size chips) will be placed between each screen zone in each soil vapor well nest. The annular seal will be injected at specific depths via a tremmie pipe. The granular bentonite will be hydrated following placement. The uppermost annular seal in each well will consist of cement grout, with a small amount of bentonite powder to reduce grout shrinking and cracking. The grout will contain bentonite and sand to shorten curing time, increase strength, and decrease heat generated from hydration. Annular materials will be placed in accordance with the drilling specification. Each well completion will be logged by onsite personnel on a Well Completion Diagram, included in **Appendix A**.

4.2 Surface and Subsurface Soil Investigation

Surface soil samples will be collected at selected locations within the DPT soil vapor grids for analysis of volatile organics to support performance of risk screenings for exposure to affected surface soil, if present. In general, subsurface soil will be evaluated qualitatively for lithology during drilling; samples will not be collected for analysis unless indicated by PID screening of soil cores.

4.2.1 Surface Soil Sampling Activities

Surface soil samples will be collected to evaluate the potential risks posed by surface contamination and to identify potential source areas. Surface soil samples will be collected at the DACTD maintenance yard during the DPT soil vapor survey. Surface soil samples will be collected at the sample points where DPT borings are completed. These samples will be collected from the top 6 inches of soil. Samples will be collected using Encore™ samplers at the selected sampling points and analyzed for VOCs using EPA method SW5035/8260B. Surface soil samples will also be collected where and if additional soil vapor survey investigations are conducted. The number and types of samples are listed in **Table 4-1**. The FTL will be responsible for collecting, packaging, and shipping the soil samples. A discussion of sample handling procedures is included in **Section 5**.

4.2.2 Subsurface Soil Drilling Activities

A 10-inch borehole will be drilled using hollow stem auger (HSA) technique through the vadose zone at each planed monitor well location (see **Section 4.3**) to a depth to be determined based on the approximate depth of the water table. Due to topographic differences across the site, the depth to the water table can vary in depth between approximately 85 feet and 250 feet bgs. Each borehole will be continuously sampled via a split-core barrel sampler. During lithologic logging, each core will be field screened with a PID to evaluate the presence of organic vapors. Subsurface soil samples may be collected during drilling for volatile organic compound analysis, if warranted based on visual or olfactory observations, and/or PID and head space measurements taken during drilling. For cost-estimating purposes, it is assumed that up to four samples will be collected from each boring. Three of the sample depths will correspond to the highest PID and/or head space measurements, if detected, and the fourth will be collected from the bottom of the boring.

For subsurface soil samples collected from borings where soil vapor monitor wells will be screened, the sample depths will correspond to the screened intervals of each well. Samples will be collected using Encore™ samplers at the selected sampling points and analyzed for VOCs using EPA method SW5035/8260B. The FTL will be responsible for determining sample depths, logging the soil, and collecting, packaging, and shipping the soil samples. A discussion of sample handling procedures is included in **Section 5**.

4.3 Groundwater Investigation

An existing well survey and reconnaissance is the first activity planned for the investigation. Initial water table groundwater monitoring locations have been selected based on existing data. Additional locations will be selected based on the results of sampling of the initial wells. In addition, up to six multi-level groundwater monitor wells will be installed to help evaluate the vertical extent of contamination. The Flexible Liner Underground Technologies, Ltd. (FLUTe) Water FLUTe multi-level water sampling system will be used for these wells. Additional information about the Water FLUTe is included in **Section 4.1.3**. The well installations will be followed by aquifer testing and two rounds of groundwater sampling and water level measurements. A discussion of each activity is provided below.

4.3.1 Pre-Drilling Activities

Prior to beginning drilling and well installations, the existing well survey and site reconnaissance will be performed. The site reconnaissance and well survey will be performed as described in **Section 3-1**. The site reconnaissance will be used to assess the locations of monitor well installations, and the well survey will be used to determine which existing wells may be used for sampling purposes during the investigation.

4.3.2 Water Table Monitor Well Installation

Up to 22 wells will be installed and completed at the water table. The depth to the water table varies at the site between approximately 85 feet and 250 feet bgs. Installation of these wells will be conducted in two phases. The first phase will involve the installation of 12 wells. Each well will be sampled immediately after installation and development to determine if site contaminants are present. This data will then be used to evaluate step-out locations for additional installations. Following this first phase, the need for additional wells will be evaluated. Up to 10 additional wells will be installed in the second phase to determine the horizontal extent of contamination. Locations for the initial 12 wells are shown on **Figure 4-2**.

The monitoring wells will be constructed of 2 inch internal diameter (ID), Schedule 80 PVC risers with 15 feet of 0.010 inch slotted, Schedule 80 PVC screen. Based on an evaluation of existing data, it was

noticed that MW-6, located near the DACTD maintenance yard, has gone dry. The fifteen feet screen length is proposed in an attempt to prevent these wells from going dry and to allow for fluctuations in the water table. Specific instructions on well construction, installation, and development will be included in the drilling specifications, provided under separate cover.

As discussed in **Section 3.1.2**, all locations will be visually surveyed for utilities prior to drilling. Each borehole will be logged by the onsite geologist/engineer on a Soil Boring/Well Completion Log, included in **Appendix A**. All fluids and cuttings produced during drilling will be contained and disposed as described in **Section 7.2**.

4.3.3 Water FLUTe Installation Activities

Up to six Water FLUTes will be installed to assist with determination of the vertical extent of contamination. The Water FLUTe is a unique liner system that effectively seals the entire length of the borehole once installed. Sample ports are installed in the liner at the desired depths to allow for sample collection. The sample ports are connected to tubing. Each sampling port is separate from the others, and the tubing connected to each port allows for the collection of water levels and groundwater samples. The sampling ports are in direct contact with the formation or well screen pack, and no water is retained in the well casing (if casing is left in the borehole). The liner is deployed into the borehole by filling with water. The Water FLUTe can be installed in cased and uncased boreholes, and a 10 to 12 port sampling system can be installed into a 6 inch borehole.

Each Water FLUTe will be completed in a single borehole and contain 3 to 6 individual sampling ports set at different depths. The depth of completion for these wells is unknown at this time, but based on the existing data, drilling is not anticipated to go below 700 feet bgs. This depth is based on the screened interval of the deepest affected municipal supply well, CLC Well No. 27 (see **Figure 4-3**). **Figures 4-3**, **4-4**, and **4-5** are cross-sections that show the depths where wells at the site are screened relative to the water table, the ground surface, and each other (for some wells, elevations are not precise due to a lack of surveyed elevations, and the screened interval(s) for Well No. 21 is unknown). This information has been used to gain an understanding of the potential depth of the investigation and to determine where wells are screened relative to each other.

The first Water FLUTe will be installed at the DACTD maintenance yard during the first phase of well installations. During drilling, a device capable of collecting groundwater samples during drilling, the MaxiSimulProbe, will be used to obtain groundwater quality data at multiple intervals. It is anticipated that these samples will be collected every 50 ft. during drilling, but the actual sampling interval will be determined by the conditions encountered during drilling. In addition, geophysical logging will be employed to better characterize the geology and hydrogeology at depth across the site. The groundwater samples collected during drilling will be submitted to an offsite laboratory for rapid turnaround time, and the results will be used along with geophysical logging results to determine the placement depth of the sampling ports for the Water FLUTe. This first Water FLUTe monitor well will then be sampled, and the results will be used to evaluate the depth of investigation for the other Water FLUTe monitor wells.

The locations of the Water FLUTe multi-level wells will be determined based on the sampling results of the water table monitoring wells and the first Water FLUTe monitor well. The locations are anticipated to be at or near the areas(s) of highest concentrations detected in the water table monitoring wells. The PM and FTL will be responsible for determining the exact locations.

4.3.3.1 Drilling Activities

A mud rotary and/or air rotary drilling rig will be utilized to drill the deeper monitor wells. A 6 inch borehole will be drilled at each location to the depth of well completion. Following geophysical logging (described in **Section 4.3.3.2**), annular materials (described in **Section 4.3.4**) and a screened casing will be place in the borehole. Each screened interval in the casing will be developed (described in **Section 4.3.4**), and the Water FLUTe multi-level sampling system will be installed through the casing at each location. During drilling activities, the onsite FTL will be responsible for overseeing the work and determining exact drilling locations.

During drilling, a soil sample will be collected from one discrete interval to evaluate the physical properties of the aquifer matrix. This sample will be tested for unsaturated hydraulic conductivity, grain size, specific gravity, bulk density, total organic carbon (TOC), and percent moisture at an offsite geotechnical laboratory. The FTL will be responsible for determining the exact location of sample collection.

As discussed in **Section 3.1.2**, all locations will be visually examined for utilities prior to drilling. Each boring will be logged by the onsite geologist/engineer on a Soil Boring/Well Completion Log, included in **Appendix A**. All fluids and cuttings produced during drilling will be contained and disposed as described in **Section 7.2**.

4.3.3.2 Geophysical Logging

Geophysical logs will be run on all the Water FLUTe multi-level monitor well boreholes. Natural gamma, resistivity, temperature, and sponteneous potential logs will be run following drilling of the pilot hole at each location. The logging services will be subcontracted by the driller. Additional instructions on logging will be included in the drilling specifications, provided under separate cover. Results of the geophysical logging will be provided by the subcontractor to the FTL and PM. The FTL and PM will interpret the results and use them to select appropriate intervals for placement of the Water FLUTe sampling ports. The depth of completion for each Water FLUTe will be determined by the PM and FTL based on the results of geophysical logging in an attempt to screen likely regions of preferential flow within the aquifer. The depth of the deepest sample port will be placed in an attempt to determine the vertical extent of contamination.

4.3.4 Placement of Annular Materials and Well Development

For the water table monitor wells, the annular materials will be placed in the open borehole in the following manner. Each borehole will be backfilled to two feet below the desired screened interval using a cement grout/bentonite mixture. The bentonite will be used to reduce shrinkage and cracking of the cement. The mixture will be placed in the borehole using a tremmie pipe. The gravel/sand pack will be placed into the borehole from two feet below to two feet above the screened interval. The gravel/sand pack will consist of thoroughly washed, hard, durable siliceous sand. The size and gradation of the gravel/sand pack will be assessed by the site geologist on the basis of field observations of formation samples. Approximately 5 feet of transition sand will be placed above the gravel/sand pack to prevent bentonite and gravel intrusion into the gravel/sand pack. Annular seals consisting of a 50:50 mixture (dry volume) of bentonite chips and sand will be placed on top of each screened zone. The two constituents will be mixed dry, then mixed with clean water and injected into the borehole using a tremmie pipe. The uppermost annular seal in each well will consist of a cement grout/bentonite mixture up to ground surface.

For the Water FLUTe multi-level sampling system, the annular materials will be placed in the open borehole in the following manner. Each borehole will be backfilled to seven feet below the desired screened interval using a cement grout/bentonite mixture. The bentonite will be used to reduce shrinkage and cracking of the cement. The mixture will be placed in the borehole using a tremmie pipe. The gravel/sand pack will be placed into the borehole from two feet below to two feet above the screened interval. The gravel/sand pack will consist of thoroughly washed, hard, durable siliceous sand. The size and gradation of the gravel/sand pack will be assessed by the site geologist on the basis of field observations of formation samples. Approximately 5 feet of transition sand will be placed above and below the gravel/sand pack to prevent bentonite and gravel intrusion into the gravel/sand pack. Annular seals consisting of a 50:50 mixture (dry volume) of bentonite chips and sand will be placed on top of each screened zone. The two constituents will be mixed dry, then mixed with clean water and injected into the borehole using a tremmie pipe. The uppermost annular seal in each well will consist of a cement grout/bentonite mixture up to ground surface.

Development of each well will be conducted to remove fluids introduced during drilling and sediments that entered the screened zone during installation. To allow for proper curing of the grout, well development will not occur until at least 24 hours after the well is installed. Specific instructions on well installation and development will be included in the drilling specifications, provided under separate cover. The FTL is responsible for overseeing all well installations and well development. The details of each well installation will be recorded on a Soil Boring/Well Completion Log, included in **Appendix A**. Records of well development will be recorded on a Well Development Record Form, included in **Appendix A**. All fluids produced during drilling and well development will be contained and disposed as described in **Section 7.2**.

4.4 Groundwater Sampling

Following construction of each monitor well, a groundwater sample will be collected. In addition, up to two rounds of groundwater sampling for all wells are anticipated. The first sampling round will occur after all wells have been installed. The second round of sampling will occur one month after the end of the first round. Samples will be obtained from existing wells and newly installed monitor wells. The number and types of samples are listed in **Table 4-1**. The groundwater samples, including associated QA/QC samples, will be submitted to an offsite laboratory for analysis of VOCs, alkalinity, total hardness, cations/anions, and TOC. All samples will be handled in accordance with **Section 5**.

Existing wells that will be sampled may include existing monitor wells, residential wells, or municipal wells. To the extent possible, samples will be collected via existing appurtenances.

All purging and sampling equipment will be decontaminated according to the specifications in **Section 7.1** prior to any sampling activities and will be protected from contamination until ready for use.

All sampling activities will be recorded in the field log book and the Field Sampling Report Form, included in **Appendix A** and as discussed in **Section 5.2**. Water in the protective casing or in the vaults around the well casing shall be removed prior to venting and purging.

If the well casing is accessible, water levels will be collected prior to sampling. The groundwater level shall be measured to the nearest 0.0l foot. Water levels shall be measured from the notch located at the top of the well casing and recorded on the well sampling form. The total depth shall be taken from the well construction diagrams or any available information source if construction diagrams are not available. The water level depth shall then be subtracted from the total depth of the well to determine the height of the water column present in the well casing.

Purging of wells is performed to evacuate water that has become stagnant in the well and therefore may not be representative of water in the aquifer. Purging and sampling shall be performed in a manner that minimizes aeration in the well bore and the agitation of sediments in the well and the formation. Purging will be conducted with submersible pumps or existing well appurtenances. No equipment shall be allowed to free-fall into a well. Water-quality indicators shall be monitored during purging (turbidity, DO, specific conductance, temperature). Equipment shall be calibrated according to manufacturer's instructions.

Municipal wells and private residential water supply wells with dedicated pumps installed will be sampled at the tap located closest to the well head and preferably upstream of any filtering devices or pressure tanks. An attempt will be made to estimate the volume of water in the well, as described below. However, if the standing water volume of the well is unknown, the tap will be allowed to run for a minimum of 15 minutes, and a sample will be collected after the parameters (described below) have stabilized.

The following information shall be recorded each time a well is purged and sampled: 1) depth to water before, during, and after purging (if the well bore is accessible), 2) well bore volume calculation (see below), 3) total depth of the monitor well, 4) the thickness of any non-aqueous layer(s), and 5) field parameters, such as pH, temperature, specific conductance, and turbidity (measured semi-continuously during purging). Careful, continuous measurement of pH, temperature, specific conductance (or electrical conductivity [EC]), dissolved oxygen (DO), turbidity, and redox potential will be made using a flow-through cell. Stabilization of these measurements will be used to identify when the purged water has reached equilibrium, which is expected to be observed after removal of between one and three well

casing volumes. Deviations from expected observations will be well-documented in the field notes. This information will be recorded on the sampling forms. Low-flow purging will be used if appropriate -- project instructions will be issued to the field team to address this possibility. Water removed from the well during purging shall be handled according to **Section 7.2**.

The well volume is defined as the volume of submerged casing and screen. One well volume can be calculated using the following equation.

V = H x F

where V = one well volume

H = the difference between the depth of well and depth to water (ft)

F = factor for volume of one-foot section of casing (gallons) from Table 1

Volume of Water in One-Foot Section of Well Casing

Diameter of Casing (inches)	F Factor (gallons)
1.5	0.09
2	0.16
3	0.37
4	0.65
6	1.47
16	10.44
24	23.49

F can also be calculated from the formula:

F = J(D/2)2 x 7.48 gal/ft3

where D = the inside diameter of the well casing (feet).

The conventional method of sampling stipulates that the sample may be collected after three well volumes have been removed and water quality parameters (such as temperature, pH, and EC) have stabilized. Guidelines for stabilization of water quality parameters during purging are defined as follows: temperature +/- 1E C, pH +/- 0.1 units, EC +/- 5 percent, redox potential +/-10 mV, turbidity +/- 10% when the turbidity is greater than 10 nephelometric turbidity units (NTUs), and DO +/- 10%. If these

parameters do not stabilize, the sample shall be collected after five well volumes have been removed, and the anomalous parameters shall be brought to the FTL's attention.

For the Water FLUTe multi-level sampling system uses compressed air to discharge water at the surface. Water levels are collected through a ½ inch diameter tube that extends to the depth of the each sample port. To sample the Water FLUTe, an inert compressed gas is attached to the ½ inch tube, and the line is pressurized to start purging. With the Water FLUTe, there is no well screen volume to be purged, but there is stagnant water within the tubing that requires purging. FLUTe recommends that two tubing volumes be purged prior to sample collection. The drive gas used for purging does not come into contact with the water in the sampling tube. After purging two tubing volumes, a groundwater sample will be collected from each sample port. Water quality parameters will be collected during purging, prior to sample collection, and after sample collection.

4.5 Aquifer Testing

Review of existing data shows a lack of specific aquifer property information for the site. However, any aquifer testing data available from the city will be obtained for use in analyzing fate and transport, characterization of hydraulic properties, and to support the design of any potential groundwater extraction system or help identify other potential remedial alternatives. If adequate data is unavailable, then a five day groundwater pumping test may be conducted if conditions warrant. The presence of the CLC's municiple well field may create non-steady state conditions in the area of the groundwater plume. An aquifer test will only be conducted if steady-state conditions can be expected within the expected effective area of the pump test. CLC Well No. 18 will be used to measure aquifer properties. A 5-day constant rate aquifer test is planned to quantify aquifer properties in the immediate area surrounding the CLC Well No. 18 site. CLC Well No. 18 will be utilized as the pumping well, assuming that it is operational. If this well is not operational, a different pumping well will be considered for the testing. With the information gathered from this aquifer test, remedial options for the site will be evaluated and screened.

The pumping well and observation wells will be monitored for one week prior to testing to establish background conditions. The aquifer test will consist of a single well pumping at a constant discharge rate

with water levels measured in the pumping well and multiple observation wells. Observation wells will be the newly installed monitoring wells and the existing wells in the area. The planned pumping rate is 200 gallons per minute (gpm). Water levels in the pumping well and up to three observational wells in the area will be monitored throughout pumping and recovery using data loggers. The pressure transducers will be selected based on the amount of drawdown expected at the observation wells. The transducers will be placed at a depth that provides readings within the accuracy range of the transducer (15 pounds per square inch (psi) transducer will read 35 feet of water). The transducers will be field tested to verify accuracy by comparing manual readings from water level indicators.

Aquifer test procedures for the single well tests are as follows:

4.1. Determine total depth of observation wells and the pumping well by sounding the bottom.
4.2. Install pressure transducers in the pumping and observation wells and set up a data logger.
4.3. Collect hourly background (pre-test) data for 24 hours prior to commencement of pumping.
4.4. Decontaminate any temporary pump and discharge pipe according to procedures specified in **Section 7.1**.
4.5. Measure the water level in the pumping well.
4.6. Lower pump into the well to approximately the top of the screened interval.
4.7. Allow water level to equilibrate to within 10 percent of the water level measure in Step 5, above.
4.8. Program the data logger to step the time interval between readings during the test, setting the readings to be collected at the desired intervals.
4.9. Start the pump and data logger simultaneously.
4.10. Collect back-up hand measurements as necessary, using a water level indicator, and monitor/measure discharge rates.
4.11. Monitor and plot field data to determine when pump test objectives (stabilized rate of drawdown) have been met, up to 72 hours.
4.12. Stop pump and stop the data logger, and continue water level reading until recovery is complete.

All purge water shall be collected in 20,000 gallon frac tanks. Disposal of the investigation-derived waste (IDW) generated during this testing will be handled according to **Section 7.2**. Specific aquifer testing procedures will be developed following completion of all wells.

4.6 Water Level Monitoring

Water levels will be monitored during each sampling event from existing wells and new monitor wells. The water levels will be utilized to construct groundwater flow maps throughout the course of the RI/FS so that groundwater flow direction can be evaluated. The maps will also be utilized by the project modeling team during calibration of the groundwater flow model.

The existing wells to be monitored will include the monitoring wells installed by the NMED (MW-SF1 through MW-SF10), the wells at the DACTD facility (MW-1 through MW-6), CLC Wells Nos. 10, 18, 19, 21, 20, 24, 26, 27, 61, and the Paz Park Well (other CLC wells may be added), the Shook Well, and any potential private wells identified through the well search and survey. Access to all private wells will be obtained prior to work.

At each location, the FTL will establish a consistent measurement port and reference point. This information, as well as all water level measurements, will be documented in the field notebook. All measurements will be made to the nearest 0.01 foot. Once Water levels are recorded and survey control established, preliminary water level maps will be generated.

Table 4-1
Sample Frequency by Method
Griggs and Walnut Ground Water Plume Site

Analyte/Method	Normal samples	Field Duplicate	Equipment Blank	Field Blank	MS/ MSD	Trip Blank	Total
Initial well sampling and MaxiSimulprobe sampling for Rapid Turn-Around-Time during investigation							
VOCs	80	10	4	4	4	25	127
Existing and New Monitoring wells (2 sampling events)							
VOCs, alkalinity, total hardness, cations/anions, TOC	95/event	10	5	5	5	5	125/event
*Surface Soil**							
VOCs	30	3	2	2	2	2	41
*Subsurface soil ***							
unsaturated hydraulic conductivity, grain size, specific gravity, bulk density, TOC, and % moinsture	1						1
VOCs	152	15	8	8	8	20	211
*Soil vapor (from DPT soil vapor surveys)****							
VOCs	145	14					
Soil vapor (from soil vapor monitor well clusters)							
[1]VOCs / SW 8021 [1]VOCs / TO-14	50	5	2	2		1	60

Notes:
MS Matrix Spike
MSD Matrix Spike Duplicate
VOCs Volatile Organic Compounds
TOC Total Organic Carbon
C Additional surface soil samples may be collected if additional soil vapor surveys are necesary
** Subsurface soil samples will be collected if source areas can be identified.
*** Additonal soil vapor surveys will be conducted if additional source areas require investigation
[1] Soil vapor samples will be collected by the soil vapor subcontractor. QA/QC sample requirements will be established in the subcontractor scope of work.

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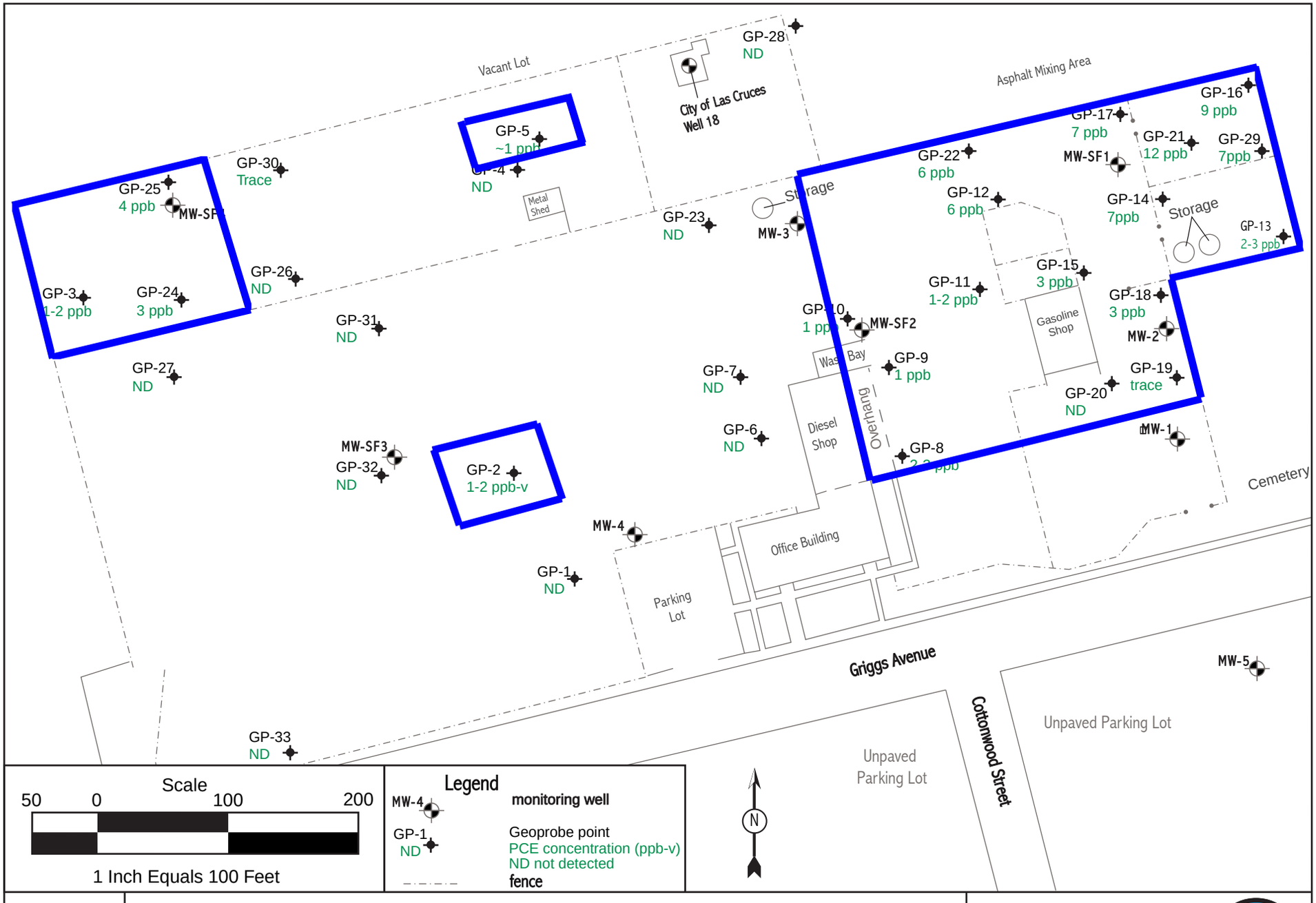

Figure 5	Results of soil vapor survey at the Doña Ana County Transportation Department, 2025 East Griggs Avenue, Las Cruces, New Mexico.	New Mexico Environment Department Ground Water Quality Bureau Superfund Oversight Section
Ground Water, Griggs and Walnut Site, CERCLIS Number: NM0002271286	Drawn by: J. Shain 8/99 Last modified by: christopher holmes 10/2000	

Proposed Areas for Soil Vapor Surveys via DPT

Figure 4-1
Soil Vapor Concentrations at 8 ft. bgs at the DACTD Maintenance Yard and Proposed Soil Vapor Survey Areas (Rerpoduced from NMED Figure)
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

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Well_18 Pce_conc.

Date	Values
03/13/1994	ND
01/10/1995	32.0
02/22/1995	1.5
02/27/1995	1.2
04/12/1995	0.5
08/18/1995	0.6
10/04/1995	ND
01/09/1996	6.4
02/21/1996	0.8
04/03/1996	0.8
05/02/1996	1.0
07/23/1996	ND
04/15/1998	15.0
06/23/1998	18.0
10/20/1998	17.0
07/20/1999	20.1
04/20/2000	7.0
7/18/2000	47.0 (Jv

Mw-3 Pce_conc.

Date	Values
03/11/1998	20.0
04/15/1998	15.0
08/31/1998	10.0
12/03/1998	11.0
03/02/1999	18.0
03/14/1999	24.00
07/13/1999	22.00
03/14/2000	24.00
07/18/2000	14.0 (Jv)

Paz_park Pce_conc.

Date	Values
04/15/1998	ND
06/23/1998	ND
07/20/1999	ND

Mw-sf1 Pce_conc.

Date	Values
03/15/2000	52.0
07/18/2000	41.0 (Jv)

Well_54 Pce_conc.

Date	Values
01/11/1995	ND
04/24/1996	ND
07/20/1999	ND
04/20/2000	ND

Well_21 Pce_conc.

Date	Values
08/09/1993	0.9
02/17/1994	0.8
06/21/1994	1.0
10/10/1994	1.0
01/10/1995	0.7
04/05/1995	1.3
08/18/1995	1.2
10/04/1995	1.2
01/09/1996	1.1
01/22/1997	1.3
04/15/1998	2.0
04/27/1998	2.0
06/23/1998	2.0
07/20/1999	2.3
04/20/2000	2.0

Mw-2 Pce_conc.

Date	Values
03/11/1998	52.0
04/15/1998	23.0
08/31/1998	35.0
12/03/1998	40.0
03/02/1999	44.0
07/13/1999	40.00
03/13/2000	26.00
07/19/2000	32.00

Well_10 Pce_conc.

Date	Values
06/07/1995	ND
07/20/1999	ND

Mw-sf10 Pce_conc.

Date	Values
07/19/2000	31.0

Mw-1 Pce_conc.

Date	Values
03/12/1998	NS
04/15/1998	3.0
08/31/1998	4.4
12/03/1998	ND
03/02/1999	1.6
07/13/1999	3.00
07/18/2000	7.00

Mw-sf8 Pce_conc.

Date	Values
07/17/2000	13.0

Lrg-7375 Pce_conc.

Date	Values
01/27/1998	ND
06/23/1998	ND

Shook_well Pce_conc.

Date	Values
05/05/1998	15.0
06/23/1998	17.0
07/15/1999	11.0

Well_19 Pce_conc.

Date	Values
03/13/1994	0.3
05/16/1994	0.3
10/03/1994	ND
01/09/1995	ND
04/05/1995	ND
08/18/1995	ND
10/04/1995	ND
01/09/1996	0.6
07/23/1997	ND
04/15/1998	1.1
06/23/1998	0.80 J
07/20/1999	1.2

Mw-sf7 Pce_conc.

Date	Values
07/17/2000	13.0

Mw-sf6 Pce_conc.

Date	Values
07/17/2000	3.0

Mw-sf5 Pce_conc.

Date	Values
07/17/2000	7.0

Mw-sf9 Pce_conc.

Date	Values
07/18/2000	ND

Well_27 Pce_conc.

Date	Values
08/09/1993	1.4
05/16/1994	0.7
06/21/1994	0.7
10/03/1994	0.6
05/09/1995	0.8
08/18/1995	ND
10/04/1995	0.8
02/23/1996	1.0
07/29/1997	1.8
04/15/1998	1.4
06/23/1998	2.0
07/20/1999	4.5
04/20/2000	4.0

Lrg-3191 Pce_conc.

Date	Values
03/12/1998	1.0
06/24/1998	0.9

Mw-sf4 Pce_conc.

Date	Values
03/14/2000	19.0
07/17/2000	17.00

Mw-sf2 Pce_conc.

Date	Values
03/14/2000	42.0

Mw-sf3 Pce_conc.

Date	Values
03/14/2000	43.0
07/17/2000	53.00

Mw-4 Pce_conc.

Date	Values
03/12/1998	8.1
04/15/1998	9.0
08/31/1998	NS
12/03/1998	NS
03/02/1999	NS
07/13/1999	7.00
03/15/2000	5.00
07/18/2000	5.00

Mw-5 Pce_conc.

Date	Values
03/12/1998	2.3
04/16/1998	3.0
08/31/1998	2.5
12/03/1998	1.0
03/02/1999	0.5
07/15/1999	3.00
03/15/2000	6.00
07/19/2000	8.00

Mw-6 Pce_conc.

Date	Values
03/24/1998	ND
04/15/1998	3.0
09/01/1998	1.4
12/04/1998	1.1
03/02/1999	1.5

CLC Well 24 Pce_conc.

Date	Values
09/26/2001	1.5

CLC Well 10
CLC Well 28
CLC Well 54
Paz Park CLC Well
CLC Well 21
CLC Well 18
CLC Well 19
CLC Well 27
CLC Well 57
CLC Well 20
CLC Well 26
CLC Well 61
CLC Well 24
Well A
Well B
Well C
Well D
Well E
Well F
Well G
Well H
Well I
Well J
Well K
Well L
LRG-3191
LRG-7375
Shook Well
MW-SF1
MW-SF2
MW-SF3
MW-SF4
MW-SF5
MW-SF6
MW-SF7
MW-SF8
MW-SF9
MW-SF10
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
A
A'
B
B'
C
C'
?

N

500 0 500 1000 Feet

Legend

- Monitor Wells (Screen Intervals Range From 3867 to 3827 MSL)
- Private Wells
- City of Las Cruces (CLC) Supply Wells (Screen Intervals Range From 3730 to 3325 MSL)
- Proposed Monitor Wells Locations
- ? Estimated Extent of PCE Detections (based on existing monitor and water supply well sample analysis)
- A — A' Locations of Cross Sections for Figures: 4-3, 4-4, & 4-5

PCE concentration units are ug/L

GWP_FSP_Ver1.1_Figure4-2.pdf

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Figure 4-2

Historical PCE Concentrations

and Proposed New Well Locations

Griggs & Walnut Ground Water Plume Site

Las Cruces, New Mexico

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A
Northwest

A'
Southeast

CLC Well 57
CLC Well 19
CLC Well 27
CLC Well 18
MW-SF1
MW-SF6
MW-SF6
Shook Well
MW-SF8
CLC Well 10

Elevation Above Mean Sea Level

4100
4000
3900
3800
3700
3600
3500
3400
3300

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000

Scale:
Horizontal 1" = 1000'
Vertical 1" = 100'
Vertical Exageration = 10:1

Note: Elevation for CLC well 57 estimated from USGS topographic quadrangle map.

Legend:

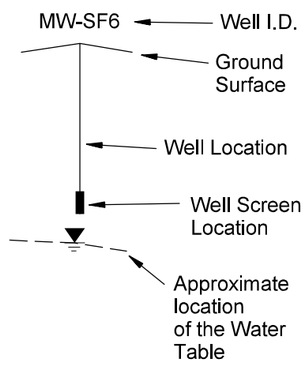

Figure 4-3
Depth of Well Screened Intervals - Cross Section A-A'
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

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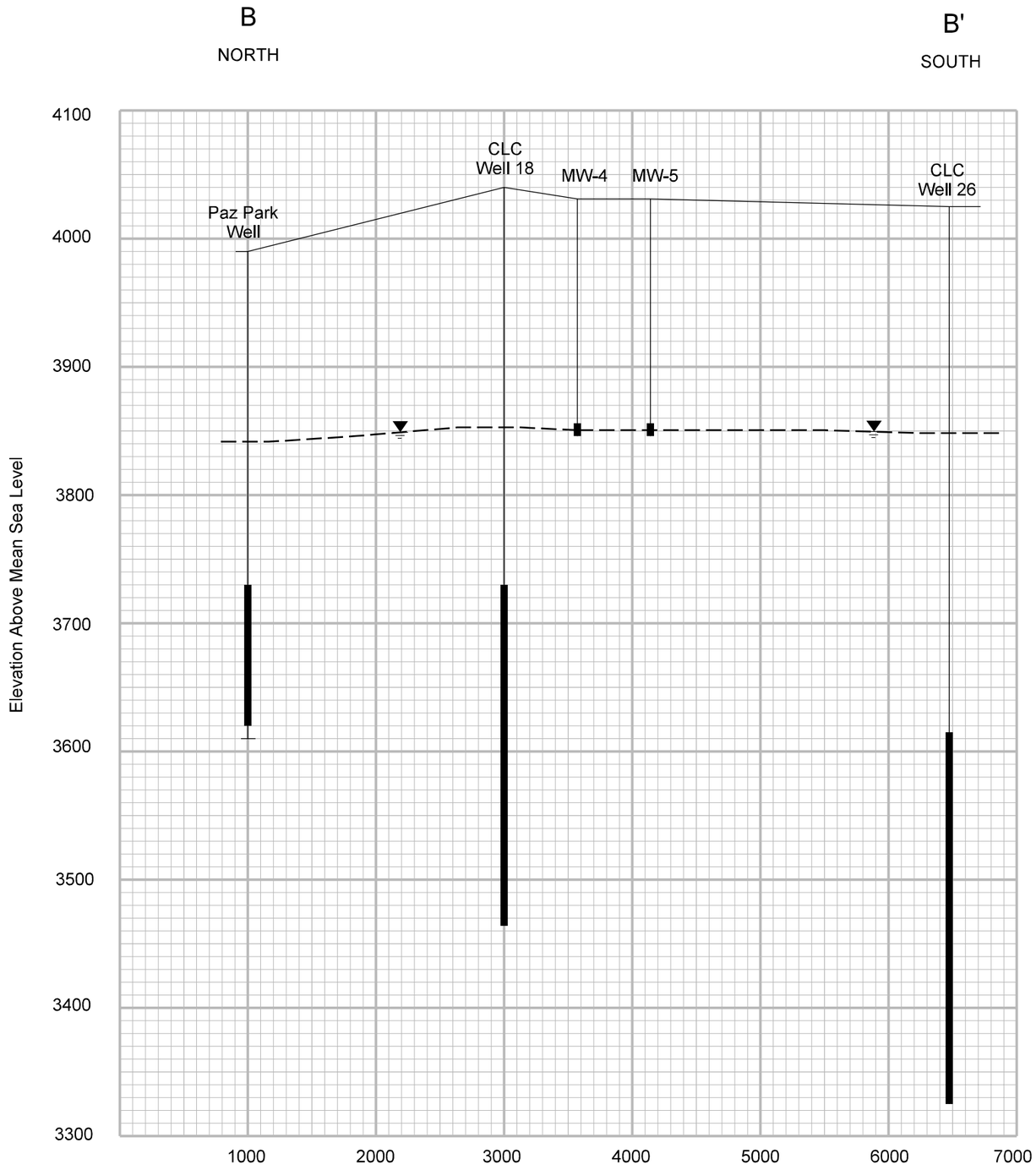

Scale:
Horizontal 1" = 1000'
Vertical 1" = 100'
Vertical Exageration = 10:1

Note: Screened Zone for CLC Well 26 is Known, but Prescence and / or Location of Multiple Screens is Unknown.

Note: Elevation for paz park well estimated from USGS topographic quadrangle map.

Legend:

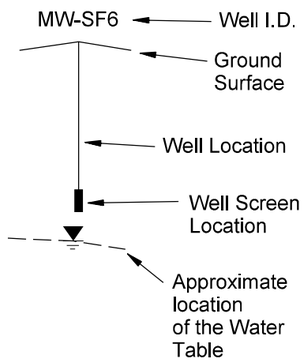

Figure 4-4
Depth of Well Screened Intervals - Cross Section B-B'
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

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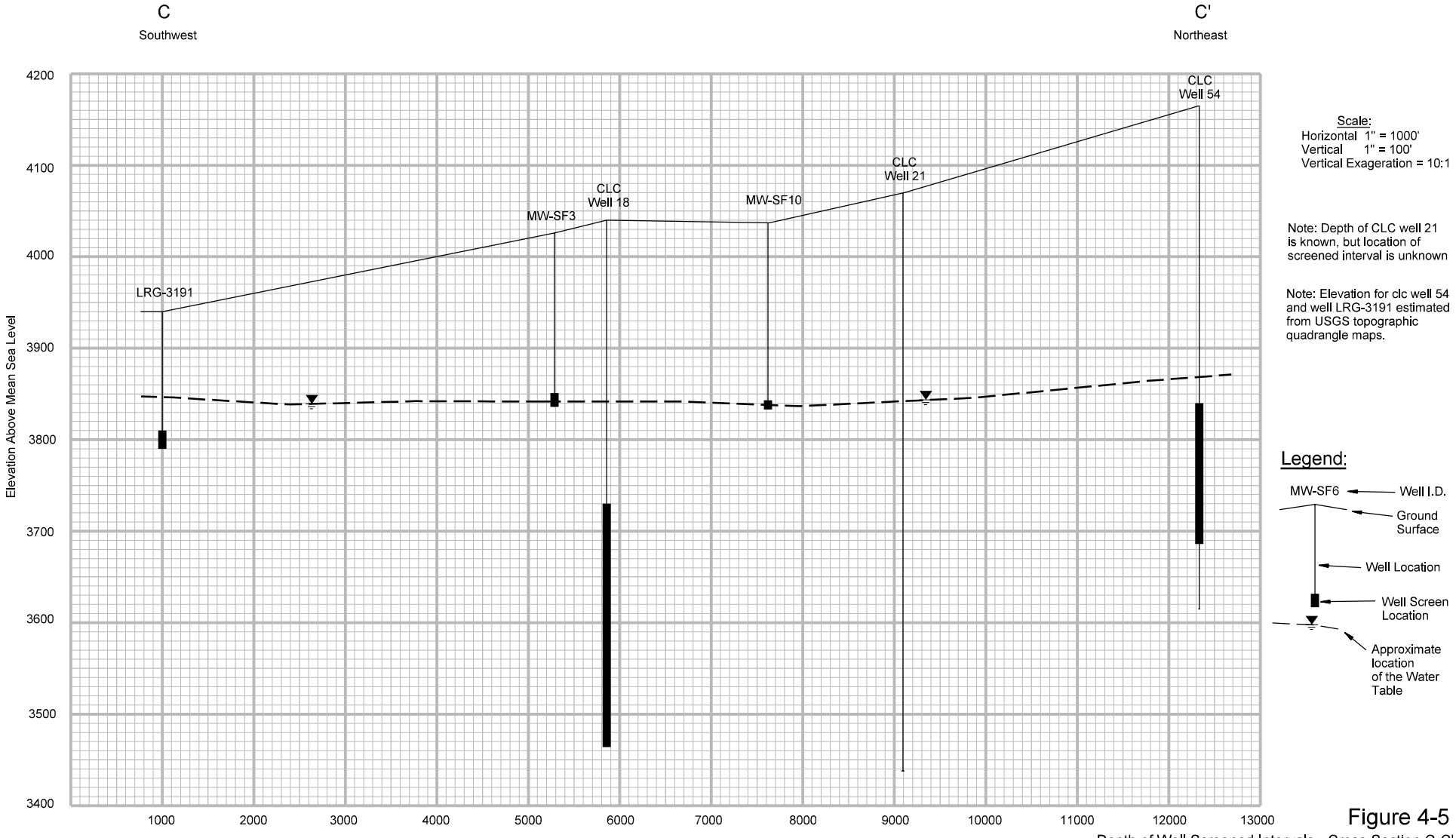

Figure 4-5

Depth of Well Screened Intervals - Cross Section C-C'
Griggs and Walnut Groundwater Plume Site
Las Cruces, New Mexico

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Section 5
Sample Handling and Analysis

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Section 5

Sample Handling and Analysis

The soil vapor samples collected via DPT will be analyzed onsite in the DPT rig. Soil gas samples collected during drilling or via soil vapor wells will be analyzed by an offsite laboratory. All groundwater and soil samples will be sent to an offsite lab, either through the Contract Laboratory Program (CLP), the EPA lab in Houston, Texas, or contracted directly (depending on turnaround time and availability).

Analytical methods are described in the QAPP (**CH2M HILL, 2002c**). **Table 5-1** provides an overview of the samples to be collected, including analytical method number, bottle type, and preservative.

5.1 Field Quality Control Samples

Quality control samples are collected to ensure the field samples can be considered representative, and include the collection of duplicates, field blanks, equipment blanks, trip blanks, matrix spike/matrix spike duplicates, and temperature blanks. Laboratory QC requirements are described in the QAPP.

5.1.1 Duplicate Samples

Duplicate samples are collected to evaluate the relative measure of precision of the sample collection process. These samples are collected at the same time using the same procedures, equipment, and sample containers as required of the original samples. They are preserved in the same manner and submitted for the same analyses. Duplicate samples will be collected during this sampling effort at a frequency of 1 duplicate per 10 samples, or a minimum of 1 duplicate per medium if less than 10 samples are collected.

5.1.2 Field Blanks

The field blank serves as a measure of sample contamination resulting from ambient field conditions, such as fugitive dust or vapors, and monitors potential contamination that may be introduced from the decontamination water. A field blank consists of pouring American Society for Testing and

Materials (ASTM) reagent grade water into sample containers under field conditions. One field blank will be collected per 20 samples collected during this sampling effort. If less than 20 samples are collected, a minimum of 1 field blank will be collected.

5.1.3 Equipment Blanks

One equipment blank will be collected per 20 samples collected for each media or one per day per piece of equipment used. Equipment blanks will be collected from the final decontamination rinsate to evaluate the success of decontamination efforts on non-dedicated/disposable equipment. Equipment blanks will be obtained by rinsing cleaned equipment with ASTM reagent grade water before sample collection. The rinsate is collected and placed in the appropriate sample containers. The equipment blanks will be analyzed for the same parameters as the corresponding samples.

5.1.4 Trip Blanks

One trip blank is sent with every cooler shipped to the offsite laboratory containing samples for VOC analysis. Trip blanks consist of a VOC vial filled with ASTM reagent grade water, transported to the site, handled as an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOCs are collected for analysis to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures.

5.1.5 Matrix Spike/Matrix Spike Duplicate

Triple sample volume will be collected for groundwater organic analysis during this effort at a frequency of 1 per 20 samples collected. Double volume will be collected for groundwater inorganic analysis at the same frequency. These additional sample containers will be labeled for matrix spike/matrix spike duplicate (MS/MSD) analysis and will be used by the laboratory for internal QC.

5.1.6 Temperature Blanks

Temperature blanks are sent with each cooler shipped to the offsite laboratory containing samples requiring preservation at 4EC. Temperature blanks consist of a non-preserved VOC vial or similar

laboratory container filled with ASTM reagent grade water. Temperature blanks are measured at the laboratory upon receipt to verify the temperature of the samples contained in that cooler. One temperature blank will be shipped with each cooler to each offsite lab.

5.2 Sample Custody and Identification

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal.

A sample is defined as being under a person's custody if any of the following conditions exist:

- It is in a person's possession.
- It is in a person's view, after being in their physical possession.
- It was in a person's physical possession and they locked it up to prevent tampering.
- It is in a designated and identified secure area.

Samples collected during this event will be managed in a manner consistent with EPA CLP laboratory guidelines. Specific sampler guidelines can be found in the *Samplers Guide to the Contract Laboratory Program* (**EPA, 1996**). Additional information may also be found in **Section 6.0**.

Each sample going to a CLP lab will be documented and identified using the appropriate EPA CLP labels, tags, and forms. A set of CLP numbers will be assigned. Samples for organic analysis will receive sample identification numbers beginning with “F”, inorganic sample identification numbers will begin with “M”, and samples for special analysis will begin with “S”. Each bottle or jar will receive a sample identification sticker, a sample tag, and a custody seal. The FORMS II Lite software will be used to generate all sample labels and Traffic Reports/Chain of Custody (COC) forms, which will remain with the samples. In addition, the FORMS II Lite software will be used for tracking and managing all sample information for samples sent to a CLP lab. COC records for all field and field QC samples will be maintained. Similar procedures will be used for non-CLP samples. However,

unique sample identifications will be generated by the database manager, as described in **Section 6.1.2**.

COC forms for samples to be analyzed both onsite or offsite at non-CLP laboratories will be hand-generated. The following minimum information concerning the sample shall be documented on the COC form:

- Unique sample identification including station identification and sample identification
- Date and time of sample collection
- Source of sample
- Designation of matrix spike/matrix spike duplicate
- Preservative used
- Analyses required
- Name of collector(s)
- Pertinent field data
- Serial numbers of custody seals and transportation cases (if used)
- Custody transfer signatures and dates and times of sample transfer from the field to transporters and to the laboratory or laboratories
- Transporter tracking number (if applicable)

All samples shall be uniquely identified, labeled, and documented in the field at the time of collection. All sample containers shall be sealed in a manner that shall prevent or detect tampering if it occurs.

Samples collected in the field shall be transported to the laboratory or field testing site as expeditiously as possible. When 4°C is required for preserving the sample, the sample shall be packed in ice to keep it cool during collection and transportation. Samples will be packaged in coolers using the following guidelines:

- Each sample bottle or jar will be placed within a lock-top bag and sealed.

- Samples for organic, inorganic, and special analysis will be placed in different coolers, as they typically will be going to different laboratories.
- Vermiculite (or other suitable packing material) will be poured and packed into the spaces around the coolers to prevent breakage of the sample containers. Ice will be placed in the coolers to help maintain the cooler temperature at approximately 4EC.
- The appropriate Traffic Report/COC forms (laboratory copies only) will be sealed in a plastic bag and taped to the inside of the cooler lid.
- Coolers will be sealed with strapping tape and at least two EPA custody seals (on opposite sides of the cooler).

5.3 Record Keeping

Field records sufficient to re-create all sampling and measurement activities will be maintained. The requirements listed in this section apply to all measuring and sampling activities. The information shall be recorded with indelible ink in a permanently bound notebook with sequentially numbered pages. These records shall be archived in an easily accessible form and made available to EPA or their authorized representative upon request.

The following information shall be recorded for all field activities: 1) sampling location, 2) date and time, 3) identity of people performing activity, and 4) weather conditions. For field measurements: 1) the numerical value and units of each measurement, and 2) the identity of, and calibration results for, each field instrument shall also be recorded.

The following additional information shall be recorded for all sampling activities: (1) sample type, date, time, and sampling method, 2) the identity of each sample and depth(s), where applicable, from which it was collected, 3) the amount of each sample, 4) sample description (e.g., color, odor, clarity), 5) identification of sampling devices, and 6) identification of conditions that might affect the representativeness of a sample (e.g., refueling operations, damaged casing). Further field documentation guidelines are provided in **Section 2.3** of the QAPP (**CH2M HILL, 2002c**).

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Table 5-1
Sample Containers, Preservatives, and Holding Time
Griggs and Walnut Groudnwater Plume Site - RI/FS

Analytical Fraction	Method	Matrix	Number of Containers	Container Size/Type	Preservative	Holding Time
Groundwater						
VOCs	CLP OLC3.2	water	2	40 mL, G	HCl pH<2, chill 4°C	14 days
Alkalinity	E310.1	water	1	50 mL, G, P	4 °C	14 days
Total Hardness	E130.2	water	1	500 mL, G, P	HNO_3, pH<2, chill, 4 °C	180 days
Common Anions	E300.0	water	1	50 mL, G, P	None	28 days for chloride, sulfate, nitrate, and phosphate
TOC	SW846/ 9060	water	1	500 mL, G, P	HCl or HNO_3, pH<2, 4 °C	28 days
Soils						
VOCs	CLP	soil	2	EnCore™	chill to 4°C	48 hours
Unsaturated Hydraulic Conductivity	ASTM D5084	soil	1	6" x 2" undisturbed soil core	seal to retain moisture	N/A
Bulk Density	ASTM D2166	soil	N/A	N/A[1]	N/A	N/A
Grain Size	ASTM D422	soil	1	500 grams[1]	N/A	N/A
Specific Gravity	ASTM D854	soil	1	100 grams[1]	N/A	N/A
Moisture	ASTM D2216	soil	1	100 grams[1]	N/A	N/A
TOC	SW9060	soil	1	8 oz	chill 4°C	28 days
Soil Vapor						
VOCs[2]	TO-14A	gas	1	6L SUMMA Canister	N/A	14 days
VOCs[3]	SW846/ 8021mod	gas	1	Gas-tight syringe	N/A	1 hour
Chemical/Physical Parameters of DNAPL						
BTU	D240-92 (1997e1)	Liquid	1	Metal Paint Can (MPC) 1L	None	
pH	9094C	Liquid	1	Amber glass 1L	Cool 4°C	
Liquid Content	9095	Liquid	1	Amber glass 1L	None	
Ash Content	D2415-97	Liquid	1	MPC 100 mL	None	
Viscosity	5018-89 (1994e1)	Liquid	1	MPC 1L	None	
Density	D4892-89 (1994)e2	Liquid	1	MPC 1L	None	

Table 5-1
Sample Containers, Preservatives, and Holding Time
Griggs and Walnut Groudnwater Plume Site - RI/FS

Analytical Fraction	Method	Matrix	Number of Containers	Container Size/Type	Preservative	Holding Time
Chemical/Physical Parameters of DNAPL						
VOCs	8260B	Liquid	3	3-40 mL VOA	HCl pH<2, cool 4°C	14 days
SVOCs	8270C	Liquid	2	2-1L glass	4°C	7/40 days
Inorganics	6010B	Liquid	1	1L glass	HNO_3 pH<2, cool 4°C	6 months
Soil IDW Characterization						
VOCs	SW846/ 8260B	soil	1	4 oz G, or EnCore	chill 4°C	14 days for leaching, 14 days for analysis

Notes: [1]Grain size, specific gravity, and moisture analyses can be combined in 2-8 oz containers, no separate container required for bulk density .
[2]To be analyzed by offsite laboratory.
[3]To be analyzed by CSL.

Section 6
Data Management Plan

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Section 6

Data Management Plan

The scope of the Data Management Plan includes planning, collecting, evaluating, storing, and reporting information gathered during the data collection activity. Analyses will be performed within the CLP whenever possible, but the need for special analyses (i.e. onsite screening or special analytes) or quick turnaround times, or the availability of CLP labs, may indicate the need for analysis outside the CLP. To cover both scenarios, two data management schemes are presented below to accommodate both CLP and non-CLP analyses.

6.1 Sample Identification

The CLP and non-CLP samples will require unique sample labels and identification. A summary of these requirements is provided below.

6.1.1 CLP Sample Labeling

The regional EPA office will provide CLP sample numbers for those samples collected and analyzed under the CLP. The EPA regional sample control coordinator (RSCC) will provide preprinted sample labels, sample tags, Traffic Report/COC forms, and custody seals for use by the field sampling team. Data generated in the field during sampling will be managed through the use of field logbooks. Samples will be collected at locations defined in the FSP and assigned sample numbers in accordance with the *"Sampler's Guide to the Contract Laboratory Program,"* EPA document EPA/540/R-96/032. The preprinted labels provided by the RSCC will be used to uniquely identify sample containers for laboratory analysis. In addition, a sample tag will be affixed to each sample.

6.1.2 Non-CLP Sample Labeling

The Database Manager will be informed of the schedule for collection of soil vapor samples and will generate labels as appropriate in advance of sample collection. Locations will be associated with each soil vapor sample ID and soil sample ID in the field at the time of collection. Samples collected and sent to the EPA lab in Houston, Texas, will follow CLP sampling guidelines and use EPA labels and documentation. The Database Manager will provide the field sampling team (including onsite

soil vapor subcontractor personnel) with preprinted sample labels, COC forms, and custody seals for samples analyzed outside the CLP. Management of data generated in the field during sampling will be accomplished through the use of field logbooks and the CH2M HILL Sample Tracking Program, which interacts with the CH2M HILL Environmental Data Management System (EDMS), proprietary data management software developed in Microsoft Access 2.0. The preprinted labels provided by the Database Manager will be used to uniquely identify sample containers for laboratory analysis.

6.2 Sample Management

The Database Manager is responsible for tracking the status of the samples sent to the lab. In addition to tracking the progress of a sample, the Database Manager reports laboratory performance with respect to sample receipt and turnaround time. In the event that the soil vapor laboratory fails to meet the project specified turnaround time, the PM and Project Chemist notified and will modify the laboratory invoice as appropriate (specific to non-CLP, non-EPA lab).

For each CLP and non-CLP sample collected, a COC will be generated as described in **Section 5.2**. In addition, sample collection information, all in-situ measurements, and observations made during collection of field samples will be documented in the field logbook as described in **Section 5.3**. A photocopy of each COC will be made and forwarded to the Database Manager daily. A photocopy of each field logbook page completed during sampling will be made and forwarded to the Database Manager weekly.

6.2.1 CLP Laboratory Data Sample Management

The field sampling team will forward a photocopy of the Traffic Report/COCs generated for that day to the Database Manager. This will serve as notification to the Database Manager of samples being shipped to the lab. There will be no formal acknowledgment by the lab for receipt of the samples. Instead, the CLP SMO will be notified by the field sampling team when samples are shipped, and the laboratory will communicate only with the CLP SMO. The Database Manager will be advised of any sample shipments that fail to be received.

6.2.2 Non-CLP Laboratory Data Sample Management

Each day, the field sampling team will forward a photocopy of the COCs generated for that day to the Database Manager. This will serve as notification to the Database Manager of samples being shipped to the EPA laboratory and offsite soil vapor laboratory or analyzed onsite at the onsite laboratory. If the soil vapor laboratory does not formally acknowledge receipt of the samples in writing, the Database Manager will contact the lab to confirm sample receipt. The Database Manager will contact the laboratory as required to monitor the status of samples sent to the lab. In addition, the Database Manager will monitor laboratory performance with regard to the project-specified turnaround times.

6.2.3 Other Data

On a weekly basis, the field sampling team, including onsite laboratory personnel, will photocopy all logbook pages for the week and forward that information to the Database Manager. Survey data will be provided by the subcontractor to the Database Manager. This information will be used to update the project analytical database. Potential information includes water level data, well construction details, boring stratigraphy, and in-situ field measurements.

6.3 Sample Data Transfer

Laboratory analytical data will be reported for each CLP and non-CLP sample collected. At a minimum, the analytical data will be reported in hardcopy format. When available, the analytical results will also be provided electronically.

6.3.1 CLP Laboratory Data Transfer

The laboratory data deliverables provided under the CLP include the pre-validation hardcopy data package, and an electronic worksheet containing the post validation results. The electronic worksheet will be provided on a 3.5-inch diskette. The hardcopy data package and diskette deliverable will be shipped by courier service.

6.3.2 Non-CLP Laboratory Data Transfer

The laboratory data deliverables provided for non-CLP samples include a hardcopy data package. For soil vapor samples, an electronic data deliverable (EDD) will also be provided. The specifications and valid values for the EDD file will be provided to the laboratory by the Database Manager. The EDD will be transmitted by e-mail to the Database Manager and by first-class mail to the PM. The hardcopy data package will be shipped by courier service.

6.3.3 Other Data Transfer

The photocopies generated by the field sampling team will be shipped by overnight courier service or fax.

6.4 Sample Data Storage

Both hardcopy and electronic data deliverables will be received and stored for this project. The hardcopy data packages will be filed by sample delivery group (SDG) or laboratory batch, as appropriate. Custody of the hardcopy data packages will be tracked through a sign-out log. Photocopies of field logbook pages and COC forms are filed chronologically in a data management notebook. The electronic data will be stored in the EDMS maintained for the project. The data files will be maintained on a local area network server. Database access is password-protected at both the network and EDMS level.

6.4.1 CLP Laboratory Data Storage

Information from the hardcopy data packages will be transcribed by the Database Manager or a designee into a Microsoft Excel Version 5.0 template. This task will be accomplished on a per SDG basis. The resulting Excel file will be used to update EDMS with the analytical results generated under the CLP. A summary report of the updated analytical results will be generated through EDMS and used to verify the accuracy of the update. Any errors noted in transcription will be documented and resolved. The hardcopy data deliverables will be filed as noted above.

6.4.2 Non-CLP Laboratory Data Storage

Information from the hardcopy data packages, generated by the EPA lab in Houston, Texas, and private geotechnical laboratory, will be transcribed by the Database Manager or a designee into a Microsoft Excel version 5.0 template. This task will be accomplished on a per SDG basis. The resulting Excel file will be used to update EDMS with the analytical results for the non-CLP samples. A summary report of the updated analytical results will be generated through EDMS and used to verify the accuracy of the update. Any errors in transcription noted will be documented and resolved. The hardcopy deliverables will be filed as noted above.

The electronic data deliverable generated for non-CLP soil vapor samples will be used to update EDMS with the laboratory analytical results. The EDD file will be generated by the soil vapor laboratory in accordance with specifications provided by the Database Manager. QC queries will be executed to verify correct format and content of the EDD. Any errors noted will be documented, and the laboratory will be contacted for corrections. The hardcopy data deliverables will be filed as noted above.

6.4.3 Other Data Storage

Field sampling data, in-situ measurements, and locational information will be transcribed directly from the photocopy deliverables into EDMS. A summary report will be generated through EDMS for verification purposes. Any transcription errors noted will be documented and resolved. The photocopies will be filed in the project data management notebook. The source logbooks or documents will by maintained by the project manager or a designee thereof.

6.5 Data Evaluation

The data evaluation phase of the project includes activities to assess the validity and technical significance of the analytical data.

6.5.1 Data Validation

The Project Chemist will review output, generated through EDMS and supporting hardcopy reports, to assess the quality of the data with respect to the project-specific DQOs. EPA staff will perform the data validation task for those samples analyzed under CLP, however, the Project Chemist will evaluate QC trends.

6.5.1.1 CLP Data Validation

Validation tasks of CLP analyses will be performed by the regional EPA Sample Management Office for samples analyzed under the CLP. The results of the data validation process will be provided in electronic format as a worksheet file. The worksheet file will be used to update EDMS. A report summarizing the update will be generated and verified against the source file. Any errors noted will be documented and resolved.

6.5.1.2 Non-CLP Data Validation

The Database Manager or a designee will make photocopies of the field sample results from the hardcopy data package for non-CLP samples. These copies will be used by the validators during the validation process. The laboratory report photocopies will be edited in red pen by the data validation personnel to indicate desired changes to results and qualifiers. The validation modifications will then be manually made to the EDMS data set. A report summarizing the results and qualifiers for each sample in each SDG or lab batch will then be generated. These summary reports will be used to verify that the requested validation modifications were made to the EDMS data set. During this verification process, each result and qualifier will be confirmed against the hardcopy deliverable for both modified and unmodified results.

6.5.2 Technical Evaluation

Once the information is updated and verified in EDMS, it will be used to generate data quality summary tables. The Project Chemist will review the data quality summary tables to determine if any global modifications are required for the data set. The Project Chemist will document those modifications and request that the Database Manager update EDMS accordingly. Once these modifications to EDMS are complete, the validated data will then be available to various members of

the project team to support the technical evaluations regarding site conditions and remediation strategies. The potential data evaluation activities include statistical reduction, nature and extent evaluation, trend analysis, and risk assessment.

6.6 Data Reporting

The Database Manager will provide support to the project team through generation of data summary tables, criteria comparison tables, analytical data tables, statistical summary tables, and a risk assessment statistical database.

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Section 7
Decontamination and IDW Procedures

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Section 7

Decontamination and IDW Procedures

Proper handling of contaminated equipment and IDW are an integral part of the field investigation. The following paragraphs describe the procedures to be followed.

7.1 Equipment Decontamination Procedures

All equipment that may directly or indirectly come in contact with samples, including sampling devices and instruments such as water level indicators, shall be decontaminated. In addition, each sample will be prevented from coming into contact with potentially-contaminating substances, such as tape, oil, engine exhaust, corroded surfaces, and dirt.

Decontamination of field instruments will be instrument-specific. The probes of all field meters will be rinsed with reagent-grade water before and after each use. Water level indicators will be wiped down with reagent-grade water.

The following procedure will be used to decontaminate sampling devices that can be hand-manipulated (i.e., stainless steel trowels and bowls). The equipment will be scrubbed with a solution of potable water and Alconox, or equivalent laboratory-grade detergent. The equipment will then be rinsed thoroughly with potable water, followed by an ASTM Type II reagent water rinse. High pressure liquid chromatograph-grade water and distilled water purchased in stores are not acceptable substitutes for ASTM Type II reagent-grade water. The equipment then will be rinsed with pesticide-grade methanol. The equipment will be air-dried on an elevated clean surface or rack (made of Teflon, stainless-steel, or oil-free aluminum). If the sampling device will not be used immediately after being decontaminated, it shall be wrapped in oil-free aluminum foil, or placed in a closed stainless-steel, glass, or Teflon container.

ASTM Type II reagent-grade water will be purchased, stored, and dispensed only in glass, stainless-steel, or Teflon containers with Teflon caps or cap liners and care will be taken to ensure these materials remain free of contaminants. If any question of purity exists, new materials will be used.

7.2 Investigation-Derived Waste Handling Procedures

This section outlines the types of IDW likely to be generated during the performance of the field activities and provides procedures for the handling, storage, characterization, and disposal of these wastes.

7.2.1 Purge Water

Purge water generated during groundwater sampling of existing wells will be containerized temporarily in 250- or 500-gallon poly tanks provided by a subcontractor. Development water will be temporarily containerized by the driller. Purge water generated during the aquifer test will be containerized in several 20,000-gallon frac tanks. At this time, it is anticipated that all purge water generated during field activities will be disposed in the City's sanitary sewer system. If necessary, revised instructions will be developed. During mobilization, CH2M HILL will coordinate with City officials to arrange the necessary details of this disposal to the sanitary sewer. The actual point of discharge and rate of discharge will be determined by the City. It is assumed that no analytical testing of the purge water is required.

7.2.2 Soil Cuttings

Waste soil cuttings will be generated during the installation of soil vapor monitor wells, monitor wells, and drilling of borings for subsurface soil sampling. It is likely that all of these soils will be considered nonhazardous. This soil will be containerized in roll-off boxes. The IDW will be sampled for total VOCs, semivolatiles, pesticides and herbicides, polychlorinated biphenyls, metals, and total petroleum carbons. One sample will be collected per roll-off box. This information will be used to determine the method and level of disposal necessary for the soil IDW. Updated IDW sampling instructions will be provided under separate cover. Detailed documentation of IDW quantities, method of transport, bill of lading, manifest numbers, and destination will be recorded in the field notebook. The IDW soil will be sampled by the field team in order to characterize the soil contamination.

7.2.3 Decontamination Fluids

Decontamination of reusable sampling equipment will be necessary during the performance of this sampling effort for rinsing of probes, beakers, and buckets. These activities will generate waste decontamination fluids consisting of water and methanol. Waste fluids will be included with the purge water, discussed in **Section 7.2.1**.

7.2.4 Personal Protective Equipment and Disposable Sampling Equipment

Waste personal protective equipment (PPE) and disposable sampling equipment and materials will be generated during the performance of the sampling. Waste PPE will include nitrile gloves. Disposable sampling equipment will include C-flex tubing, water filters, and paper towels. It is anticipated that the used PPE and disposable sampling equipment will be classified as non-hazardous waste. The material will be disposed of as non-hazardous solid waste.

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Section 8
References

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Section 8

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Appendix A
Field Forms

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CH2MHILL	PROJECT NUMBER	BORING NUMBER SHEET ___ OF ___
		SOIL BORING LOG

PROJECT : Griggs and Walnut Groundwater Plume LOCATION :

ELEVATION : DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START: END: LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

[This page intentionally left blank.]

CH2MHILL	PROJECT NUMBER	SHEET OF
	Field Sampling Report Form	

PROJECT: **LOCATION:**

DATE & TIME	SAMPLE LOCATION	SAMPLE ID	SAMPLE TYPE (i.e., sediment, groundwater, etc.)	NAME OF SAMPLER	SAMPLE VOLUME, CONTAINER TYPE, PRESERVATIVE	REMARKS (COLOR, ODOR, SHEEN, SEDIMENT, ETC)

EQUIPMENT USED (MAKE, MODEL, SER. No.):

COMMENTS:

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Sample Location Survey Form
Griggs and Walnut Groundwater Plume Site RI/FS

Site Description: _____

Activity Description: _____

_____

Sample Location: _____

_____

Potential Site Threats: _____

_____

Comments: _____

_____

Overhead or Subsurface Utilities (*Note: distance to and type of nearest utilities)*

_____

Persons or Representatives present when survey performed: _____

_____

Corrective Actions Required *(e.g., need to move hole...)*:

_____

_____

Information Recorded by: _____ **(CH2M HILL)**

Title: _____

Date: _____

[This page intentionally left blank.]

Utility Clearance Form

Job Number:_____

Activity Description:

_____

Cleared Location:

_____

_____

Approved by:_____

Title:_____

Date: _____

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CH2MHILL	PROJECT NUMBER	WELL NUMBER SHEET OF

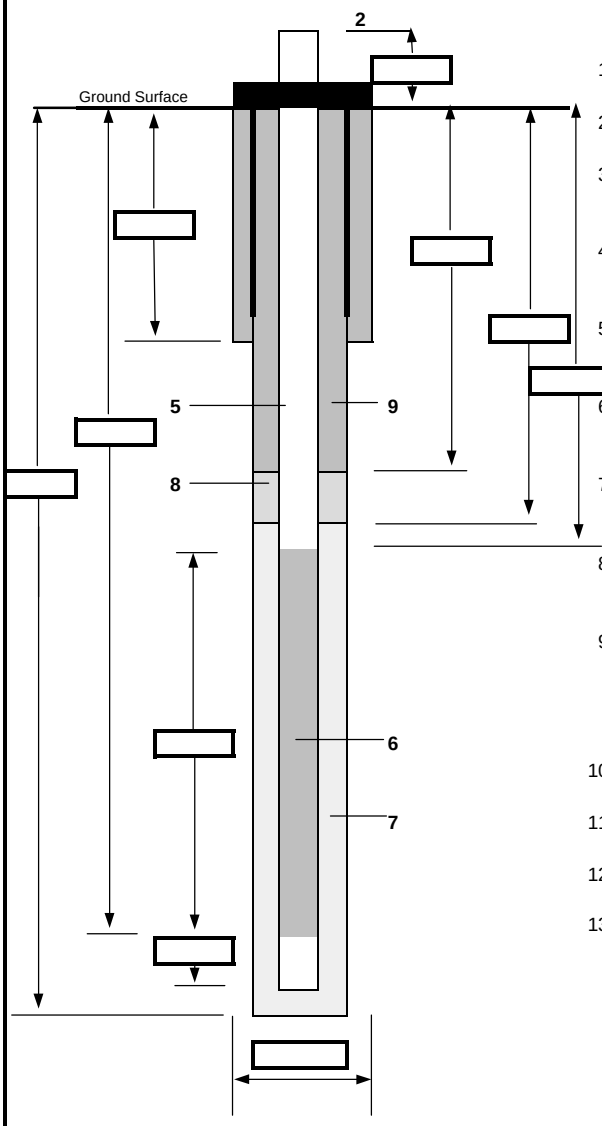
WELL COMPLETION DIAGRAM

PROJECT : Griggs and Walnut Groundwater Plume, Las Cruces, New Mexico LOCATION :

ELEVATION : DRILLING CONTRACTOR :

DRILLING METHOD & EQUIPMENT:

WATER LEVELS : START : END : LOGGER:



1- Ground elevation at well _____

2- Top of casing elevation _____

3- Wellhead/protection cover description _____

4- Diameter/type of surface casing(s) _____

a) Quantity(s) of surface casing grout used _____

5- Diameter/type of well casing _____

6- Type/slot size of screen _____

7- Type screen filter _____

a) Quantity used _____ size: _____

8- Type of seal _____

a) Quantity used _____

9- Grout _____

a) Grout mix used _____

b) Method of placement _____

c) Quantity of well casing grout _____

10- Development method _____

11- Development time _____

12- Estimated volume of water purged _____

13- Comments: _____

All measurements are from ground surface.

[This page intentionally left blank.]

CH2MHILL

PROJECT NUMBER

WELL NUMBER

SHEET

WELL DEVELOPMENT LOG

PROJECT:

LOCATION:

START: **END:**

DEVELOPMENT CONTRACTOR:

FIELD HYDROGEOLOGIST:

SCREEN INTERVAL:

PUMP PLACEMENT:

WELL DIAMETER AND MATERIAL:

TIME	WATER VOLUME DISCHARGED	WATER LEVEL (BTOC)	Ph	TURB. (NTU)	COND. (umhos/cm)	TEMP. (CELSIUS)	DO (mg/L)	ORP	REMARKS (COLOR, ODOR, SHEEN, SEDIMENT, ETC)

EQUIPMENT USED (MAKE, MODEL, SER. No.):

METHOD USED FOR DEVELOPMENT (i.e. air-lift, overpumping/surging, bailer, etc…):

TOTAL VOLUME H_2O PURGED FROM WELL (GALLONS):

COMMENTS:

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Well Purge and Sampling Field Data Sheet

CH2MHILL

Project #: | **Date**

Well Number: | **Site:** Griggs and Walnut Groundwater Plume Site

Field Crew:

			Casing Diameter		gal/ft of casing
Depth to Water (ft):	=		**2 inch**		**0.01632**
Well Depth (ft.):	-		**4 inch**		**0.06528**
Water Column (ft):	=		**6 inch**		**1.4688**
Gal/ft of Casing:	x		**8 inch**		**2.611**
Casing Volume (gal)	=		**10 inch**		**4.0797**
No. of Volumes (min.	x		**12 inch**		**5.8748**
Purge Volume (gal):	=				

Method of Purging (circle one)

PUMP: SUB. CENT. PERIST.	**OTHER:**	**BAILER:** TEFLON, SS, OTHER
TIME ON:		BAILER VOL. (gal):
FLOW RATE (gpm):		REQUIRED PULLS:
PUMP TIME (min):		VOL. PURGED (gals):
VOL. PURGED (gals):		OTHER:

FIELD PARAMETERS	**FIELD MEASUREMENTS**					WITHIN 10% Y/N
	1st	2nd	3rd	4th	5th	6th
TIME						
Depth to Water (ft):						
VOL. (gal):						
FLOW RATE (gpm):						
pH (s. units)						
TEMP. (C)						
D. O. (mg/L)						
Turbidity (NTU)						
REDOX						
ORP						
COND (umohs/cm)						

SAMPLE PARAMETERS (**GRAB** or **COMPOSITE**):

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

Observations

Color: Clear Other (describe):

Odor: None Low Medium High Very Strong H2S Fuel-Like

Turbidity: None Low Medium High

COMMENTS:

OTHER: PLEASE USE BACK OF SHEET FOR SKETCHING MAPS, NOTES, ETC. **SEE BACK OF SHEET Y / N**

QC SAMPLE TYPE: DUPLICATE EQUIPEMENT BLANK OTHER

QC PARAMETERS:

SAMPLE DATE/TIME:

Signed/Sampler:

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Appendix B
Desktop Instructions: Property Control Representation

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CH2MHILL

PROPERTY CONTROL REPRESENTATIVE (PCR)

DESKTOP OPERATING INSTRUCTIONS (DOI)

(EPA Programs)

AND

ISSUE AND RECEIPT DOCUMENTS FOR GOVERNMENT OWNED MATERIALS AND EQUIPMENT

Revision C Approval Thomas M. Farley

Date 7/6/98

CH2MHILL

The following Property Management package contains instructions that have been derived from CH2M Hill's Government Property Management Manual, and will aid individuals to function as a Property Control Representative (PCR). This package contains Desktop Operating Instructions (DOI) for EPA Programs in the receiving and issuance of government owned material and management of government owned equipment. It also provides copies of all forms that are required to receive, issue and maintain inventories of government owned material and equipment.

In the event that questions or problems arise, contact the undersigned at (303) 771-0952 ext. 2442.

Tom Tschudy
Property/Asset Manager

CH2MHILL

TABLE OF CONTENTS

CH2MHILL

Control of Government Owned Material
EPA Cost Reimbursement Contracts
DOI
(Desk Operating Instructions)

This DOI is a condensed set of EPA contract specific instructions derived from the CH2M HILL Government Property Management Manual for the accountability of Federal Government owned material acquired as a direct charge to Cost Reimbursement type contracts. Government owned material must only be used for the work assignment for which it was acquired, unless transfer of costs and written authorization to use on other work assignments or contracts is granted by the Contracting Officer or specified in the Work Assignment or contract. This specific DOI details material control from receiving to maintaining and issuance of government owned material. It is vital that all company employees understand the importance of keeping accurate receiving and inventory records. Failure to maintain records of government-owned property, which are the official government records both on-site and at company offices, is in violation of Contract provisions. An unsatisfactory Property Control rating will result in reduced profits on award fee contracts, liability for all government property, as well as the inability to obtain future work.

Definitions:

Consumable Material: Consumable, non-reusable items, or items incorporated into end-items (e.g. monitoring systems, pumps, etc.), that will be purchased on a continuing basis (e.g., plastic bottles, rubber gloves, packing boxes, purchased parts, assemblies, components, pumps, paper, nuts, bolts, etc.)

Expendable Material: Reusable items, that are purchased on a periodic basis as the items wear out (e.g., hammers, pliers, manual screwdrivers, flashlights, wire brushes, tool boxes, etc.)

Contractor Acquired Property (CAP): Property that is purchased by the contractor and charged direct to a cost reimbursable type contract, which in turn becomes Government property.

Government Furnished Property (GFP): Government owned property that is provided to the contractor by the government.

Property Control Representative (PCR): The individual assigned by the Program or Project Manager who is responsible on-site for the management and control of property, both equipment and materials. The PCR coordinates activities with the CH2M HILL Property Manager and assigned Contract Administrator.

Note: This DOI does not pertain to government owned equipment. The process for the control of equipment is addressed in a separate DOI.

Section 1: Receiving Material

A. The Property Control Representative (PCR) will be responsible for recording **all received government owned material** on the CH2M HILL Receiving Report (RR) (see page 7 of the DOI). The PCR will coordinate all receiving activity for his/her responsible work assignment.

B. Upon receipt of government owned material on site, the PCR will examine all applicable paper work, ensure quantities received match, inspect for damage, determine if CAP or GFP, assign and physically store the stock material to the appropriate Work Assignment (WA) storage area. In the event that materials are received at a remote location or field site, the

receiver (if not the PCR) will inform the PCR of the acquisition and ensure that the PCR is provided with all applicable paper work. The PCR is responsible for capturing all receiving data for his/her WA (this will include controlling receipts at all WA site locations.) The PCR must coordinate with project management and project accounting to ensure that every item purchased or furnished is recorded on a RR. Keep in mind that property may be acquired via purchase order, expense report, check request, local agreement, national agreement, etc. All property must be accounted for on a RR.

Note: All government owned stock material must be segregated and identified by individual WAs and stored in a designated storage area. Additionally, CH2M HILL owned or other contract material must be segregated from government owned material. Do not co-mingle material.

C. The PCR will create a Consumable Stock Record Log CSRL (CAP)/CSRL (GFP) (see pages 8 & 9 of the DOI) or an Expendable Stock Record Log ESRL (CAP)/ESRL (GFP) (see pages 10 & 11 of the DOI) for all newly acquired or received government material. A separate CSRL must be established for each different type of item received and each CSRL must be located in or near where property is permanently stored. All storage bins, boxes, and shelves will be appropriately identified with ownership (i.e. Property of US EPA) Contract Number and WA Number. **Note: Consumable material, which is issued and consumed immediately must still be recorded on the CSRL.**

D. All government owned expendable material must be permanently identified as government owned. Permanent ownership identification will be applied by using indelible ink or paint pen, or, scribing or etching as applicable.

E. The PCR will maintain a file of all receiving paperwork, including copies of receipts, and RRs on site for audit purposes. The paperwork will be filed by contract WA, in chronological order.

F. The PCR will forward copies of all RRs and current CSRLs and ESRLs monthly to the Property Manager.

Section 2: Distributing and Maintaining Material

A. The PCR will ensure that there is no co-mingling of stock material between WAs or between government property and CH2M HILL owned or other client contract property.

B. The PCR may establish Minimum and Maximum (Min/Max) usage of government owned consumable stock material for each WA and record it on the CSRL.

C. The PCR will ensure that all users acknowledge receipt of all consumable government owned stock materials taken by them from storage by logging quantities issued on the CSRL.

D. Expendable property items are not required to be recorded as issued each time those items are used (e.g. Hammers are recorded as received only once on an ESRL until final disposition.)

E. The PCR will maintain an accurate inventory of government owned stock material and ensure that the CSRLs and ESRLs are up-to-date. **Note: All consumable government owned stock material must be shown as received and issued on the CSRL. This includes all material regardless of how acquired (e.g., Purchase Order, Expense Sheet, etc.)**

F. PCR will maintain a file of the CSRLs and ESRLs on site for audit purposes.

G. The PCR will forward copies of all current CSRLs and ESRLs monthly to the Property Manager.

H. In the event of material Loss, Damage or Destruction (LDD), the PCR will notify the Property Manager as soon as the items are determined lost or at the time damage or destruction occurs. The Property Manager will interview the reporter, complete the LDD form and deliver it to the Government Property Administrator.

CH2MHILL

Control of Government Owned Equipment
EPA Cost Reimbursement Contracts
DOI
(Desk Operating Instructions)

This DOI is a condensed set of EPA contract specific instructions derived from the CH2M HILL Government Property Management Manual for the accountability of Federal Government owned equipment acquired as a direct charge to all Federal Government contracts. All government equipment must be identified in the contract or authorized in writing prior to acquisition by the government Contracting Officer. Equipment must only be used on the contract to which it is accountable unless "Right-to-Use" on other government contracts is authorized by the contracting officer in writing or is stated in the contract. This specific DOI details government equipment control from receipt to final disposition. It is vital that all company employees understand the importance of keeping accurate receiving and inventory records. Failure to maintain records of government-owned property, which are the official government records both on-site and at company offices is in violation of Contract provisions. An unsatisfactory Property Control rating by our client will result in reduced profits on award fee contract, liability for all government property, as well as the inability to obtain future work.

Definitions:

Equipment: Personal property, as authorized in the contract, that is commercially available (including test equipment, machine tools, furniture, and vehicles,) which is purchased or furnished for use in performing services, manufacturing supplies, or for any administrative or general use. Government equipment may either be contractor acquired (CAP) or government furnished (GFP) property (not including Leased or Rented equipment).

Contractor Acquired Property (CAP): Property that is purchased by the contractor and charged direct to a cost reimbursable type contract, which in turn becomes Government property.

Government Furnished Property (GFP): Government owned property that is provided to the contractor by the Government.

Property Control Representative (PCR): The individual assigned by the Project Manager who is responsible on-site for the management and control of property both equipment and materials. The PCR coordinates activities with the CH2M HILL Property Manager and Contract Administrator.

PMARS: The CH2M Hill "Property Management Accountability Records System" for the control of all Government and Company owned equipment.

Leased/Rental Equipment: Equipment that is leased or rented, the costs being a direct charge to the client, is not considered government property. However, it is extremely important that these items are used only on the contract Work Assignment for which they are obtained. Non-adherence to this stipulation is a misappropriation of U.S. Government funds and is in direct violation of our contract.

Note: This DOI does not pertain to government owned material. The process for the control of material will be addressed in a separate DOI.

Section 1: Receiving Equipment

A. The PCR will be responsible for recording all received equipment on the CH2M HILL Receiving Report (RR). **Note: All newly acquired government owned equipment must be tagged with the appropriate Property Identification Tag. (e.g. U.S. EPA owned tag.) CH2M HILL owned equipment is tagged with CH2M HILL ownership tags.**

B. Upon the receipt of government owned equipment on site, the PCR will examine all applicable paper work, insure quantities received match, inspect for damage and serviceability, determine if CAP or GFP assign and physically store the equipment in the appropriate Work Assignment (WA) storage area. In the event that equipment is received at a remote location or field site, the receiver (if not the PCR) will inform the PCR of the acquisition and ensure the PCR is provided with all applicable paperwork. The PCR is responsible for capturing all receiving data for his/her WA (this will include controlling receipts at all WA site locations.) The PCR must coordinate with project management and project accounting to ensure that every item purchased or furnished is recorded on an RR. Keep in mind that property may be acquired via purchase order, expense report, check request, local agreement, national agreement, etc. All property must be accounted for on an RR.

C. Equipment Identification:

1. For newly acquired government equipment, the PCR will tag the item with an US EPA identification (ID) tag and record detailed equipment information on the PMARS Receiving or Change Data Entry Sheet (see page 12 of the DOI) to include property I.D. number, date received, description, serial number, model number, manufacturer, acquisition cost, contract, work assignment, maintenance, location, ownership and PCR name. **(Note: Government equipment must be designated as CAP or GFP).** The PCR will attach a copy of the RR to the completed Data Entry Sheet and send to the CH2M HILL Property Manager as soon as possible for posting to PMARS. Tag the equipment in a manner that will not hinder usage of the item but still allows for easy viewing. Try to tag as close as possible to manufacturer's information plate on the equipment.

2. For government equipment that is already tagged and in the CH2M HILL PMARS System, the receiving PCR will record the Property Identification Number, Date Received, Description, New PCR Name, and New Physical Location on the PMARS Receiving or Change Data Entry Sheet and forward with an attached copy of the RR to the Property Manager as soon as possible for posting to PMARS.

D. The PCR will maintain a copy of all applicable paperwork including RRs and PMARS Receiving or Change Data Entry Sheets on site for audit purposes.

Section 2: Maintaining Equipment

A. The assigned PCR is responsible to ensure that equipment in their PCR account is maintained and protected. PCRs must be able to locate equipment in their account within a reasonable time frame.

B. The PCR will record any changes to the equipment status on a PMARS Receiving or Change Data Entry Sheet and forward to the Property Manager for PMARS posting. Changes include such activities as location change (shipped to a different site), PCR transfer, etc.

C. The PCR will record any scheduled or unscheduled maintenance activity on a PMARS Receiving or Change Data Entry Sheet and forward to the Property Manager for PMARS posting.

D. When government owned equipment is no longer required for use on a contract and determined excess, the PCR will contact the Property Manager and receive guidance for proper course toward disposition or reutilization of the property.

E. At the completion or termination of a contract, the PCR will report all government owned equipment to the Property Manager and receive guidance for the proper course toward disposition or reutilization of the property.

F. In the event of equipment Loss, Damage or Destruction (LDD), the PCR will notify the Property Manager as soon as the items are determined lost or at the time damage or destruction occurs. The Property Manager will interview the reporter, complete the LDD form and deliver it to the Government Property Administrator.

CH2MHILL

Receiving Report (RR) Form

Order # _____ **Buyer** _____ **Date** _____
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # _____ **WA #** _____ ***Project #*** _____

Vendor Name & Address _____

City _____ **State** _____ **Zip** _____

Shipped Via _____ **Air Bill/Waybill/B.O.L. #** _____

Number of Cartons **Condition of Shipment** ☐ **Good** ☐ **Fair** ☐ **Bad** ☐ **N/A**
(Check One)

☐ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost

Discrepancies: **Overage** ☐ **Shortage** ☐ **Damaged** ☐ **Other** _____

Describe discrepancies in detail (list below)

Received By: _____ **Employee #** _____

PCR: _____ **Employee #** _____

CH2MHILL

Consumable Stock Record Log
GOVERNMENT OWNED MATERIAL
Contractor Acquired (CAP)

Office Location _____

Contract # _____ **WA #** _____ **Project #** _____
Unit of Meas. _____ **Part #** _____
Starting Bal. _____ **Start Date** _____ **Nomenclature** _____
Minimum O/H _____ **Maximum O/H** _____ **Site Location** _____

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp. # Issued To	Qty Rec'd	Rec'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks

CH2MHILL

Consumable Stock Record Log
GOVERNMENT OWNED MATERIAL
Government Furnished (GFP)

Office Location _____

Contract # _____ **WA#** _____ **Project #** _____
Unit of Meas. _____ **Part #** _____
Starting Bal. _____ **Start Date** _____ **Nomenclature** _____
Minimum O/H _____ **Maximum O/H** _____ **Site Location** _____

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp. # Issued To	Qty Rec'd	Rec'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks

CH2MHILL

Expendable Stock Record Log
GOVERNMENT OWNED MATERIAL
Contractor Acquired (CAP)

Office Location _____

Agency _____
Contract # _____ **WA #** _____ **Project #** _____
Log Start Date _____ **Site Location** _____

Note: (E)=Estimated or Quoted cost

Item #	Part #	Nomenclature	Rec'd Date	PO R #	Unit Cost	Disposition Date	Disposition By	Disposition Remarks

CH2MHILL

Expendable Stock Record Log
GOVERNMENT OWNED MATERIAL
Government Furnished (GFP)

Office Location _____

Agency _____
Contract # _____ **WA #** _____ **Project #** _____
Log Start Date _____ **Site Location** _____

Note: (E)=Estimated or Quoted cost

Item #	Part #	Name or Letter	Rec'd Date	PURS #	Unit Cost	Disposition Date	Dispositioned By	Disposition Remarks

CH2MHILL

PMARS DATA ENTRY SHEET

NOTE: ALL NEW RECEIPTS MUST HAVE A RECEIVING REPORT ATTACHED

☐ New ☐ Change

PROPERTY IDENTIFICATION NUMBER _____ **Date Received** _____

Description _____ **Serial #** _____

Manufacturer _____ **Model #** _____

Acquisition Cost _____ **Year Manufactured** _____ **Ownership** ☐ **CH2M Hill**

☐ **Non Government Client**

☐ **Government**

☐ CAP ☐ GFP

Agency _____

Contract # _____ **WA#** _____ **Project #** _____

RR Order # _____ **Buyer** _____

Maintenance Required: **Quarterly** ☐ **Semi Annually** ☐ **Annually** ☐ **Other** ☐ **No Maintenance Required** ☐
(check one)

Physical Location
(job address) _____

Superfund Site **Yes** ☐ **No** ☐

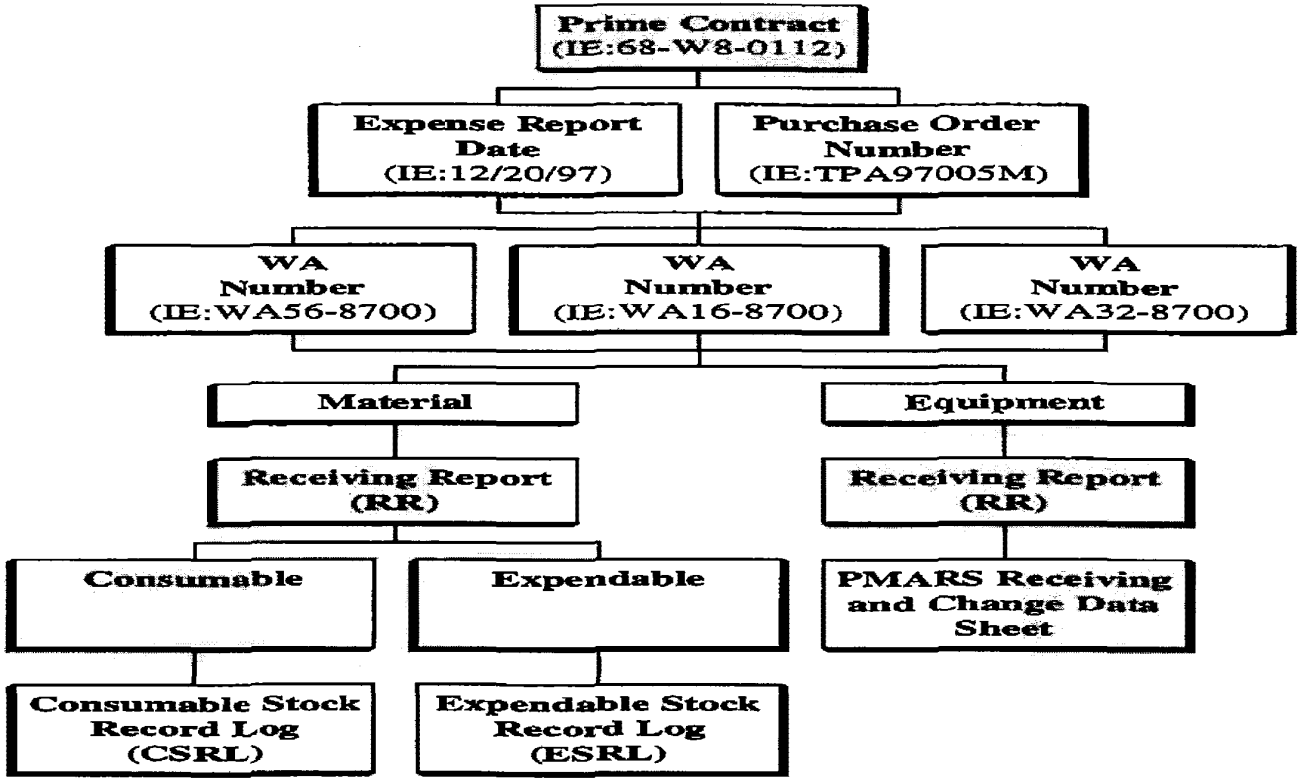
PCR Name _____ Employee # _____

Remarks:

FOR PMARS INPUT USE ONLY:
Item Code:
Date input into PMARS
Input by:

CH2MHILL

Material and Equipment Flow Chart



CH2MHILL

Property Control Representative Assignment and Responsibility Certificate

I, _____ , agree to the assignments and responsibilities as the Property Control Representative (PCR) for the CH2M Hill office located in _____ . I further agree to adhere to the instructions and
(office location)
requirements established in the CH2M Hill Government Property Management Manual and instructions issued from the Corporate Property Manager pertaining to the Firm's property management policies.

I additionally accept receipt of CH2M Hill owned equipment identification tags Numbered from _____ to _____

and Government owned equipment identification tags Numbered from _____ to _____

Agency _____

_____	_____
PCR Employee #	Project Manager
_____	_____
Date	Date
	_____
	Corporate Property Manager
	_____
	Date

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Standard Consumables Listing

Listing to be incorporated at a later date.

THIS SHEET LEFT PURPOSELY BLANK

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Standard Expendables Listing

Listing to be incorporated at a later date.

THIS SHEET LEFT PURPOSELY BLANK

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Manual On Sight Inventory Record
GOVERNMENT OWNED MATERIAL

Office Location _____

Client Sight Location _____ Physical Location _____

Contract # _____ WA # _____ Project # _____

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Attachment A

Form Examples

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EXAMPLE

Consumable Stock Record Log

GOVERNMENT OWNED MATERIAL

Contractor Acquired (CAP)

Office Location DEN

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921
Unit of Meas. BAG **Part #**
Starting Bal. 0 **Start Date** 01/19/98 **Nomenclature** Ice
Minimum O/H **Maximum O/H** **Site Location** Someplace, Colorado

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp. # Issued To	Qty Rev'd	Rev'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks
0				4	1/19/98	1/26/98-12345	$1.06	$4.24	12345		
	4	1/19/98	12345				$1.06	$4.24		40.50	OT-83 Samples

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EXAMPLE

Receiving Report (RR) Form

Expense Report Actual or Estimated Date ↓

Order # 01/26/98 – Exp. Report (IE: P.O. #, Expense Report Date, Gov. Doc., etc.) **Buyer** J. Employee/12345 (Purchase Agent, Field Tech #) **Date** 01/19/98

Contract # 69-W9-0115 **DO/WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address 7-11 Food Store #37

City Anywhere **State** CO **Zip**

Shipped Via Hand Carried **Air Bill/Waybill/B.O.L. #** N/A

Number of Cartons **Condition of Shipment** (Check One) ☐ **Good** ☐ **Fair** ☐ **Bad** ☒ **N/A**

☒ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Ice, 25 lbs		CON	4	BAGS	$1.06	$4.24
2	Baggies, 1 Gal size		CON	2	BOX	$1.28	$5.12
						↑	
						Actual Invoiced Cost (including	
						all applicable taxes)	

Discrepancies: ***Overage*** ☐ ***Shortage*** ☐ ***Damaged*** ☐ ***Other*** *N/A*

Describe discrepancies in detail (list below)

Received By: J. Employee **Employee #** 12345

PCR: J. Employee **Employee #** 12345

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EXAMPLE

Consumable Stock Record Log

GOVERNMENT OWNED MATERIAL

Contractor Acquired (CAP)

Office Location DEN

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921
Unit of Meas. BOX **Part #**
Starting Bal. 0 **Start Date** 01/19/98 **Nomenclature** Baggie - Gal size
Minimum O/H **Maximum O/H** **Site Location** Someplace AFB, Colorado

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp # Issued To	Qty Rev'd	Rev'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks
0				4	1/19/98	1/26/98-12345	$1.28	$5.12	12345		
4	1	1/19/98	13579				$1.28	$1.28		40.50	OT-83 Samples
3	2	1/27/98	13579				$1.28	$2.56		40.50	OT-83 Samples
1											

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EXAMPLE

Receiving Report (RR) Form

Expense Report Actual or Estimated Date ↓

Order # 01/26/98 – Exp. Report **Buyer** J. Employee/12345 **Date** 01/19/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **DO/WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address 7-11 Food Store #37

City Anywhere **State** CO **Zip**

Shipped Via Hand Carried **Air Bill/Waybill/B.O.L. #** N/A

Number of Cartons **Condition of Shipment** (Check One) ☐ Good ☐ Fair ☐ Bad ☒ N/A

☒ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Ice, 25 lbs		CON	4	BAGS	$1.06	$4.24
2	Baggies, 1 Gal size		CON	2	BOX	$1.28	$5.12
						↑	
						Actual Invoiced Cost (including all applicable taxes)	

Discrepancies: **Overage** ☐ **Shortage** ☐ **Damaged** ☐ **Other** N/A

Describe discrepancies in detail (list below)

Received By: J. Employee **Employee #** 12345

PCR: J. Employee **Employee #** 12345

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EXAMPLE

Consumable Stock Record Log

GOVERNMENT OWNED MATERIAL

Contractor Acquired (CAP)

Office Location DEN

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921
Unit of Meas. ROLL **Part #** CH0003
Starting Bal. 2 **Start Date** 01/04/98 **Nomenclature** C-Flex Tubing – Size 15
Minimum O/H **Maximum O/H** **Site Location** Someplace, Colorado

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp. # Issued To	Qty Rec'd	Rec'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks
2							$36.00(E)	$72.00	12345		
2				4	1/22/98	PO 654321	$36.00(E)	$216.00	12345		
6	3	1/26/98	13579				$36.00(E)	$108.00		40.50	OT-83 SAMPLING
3											

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EXAMPLE

Receiving Report (RR) Form

PO, PR or Shipper
↓

Order # PO 654321 **Buyer** K. Buyer/00359 **Date** 01/22/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address Hazco, 6501 Centerville Business Parkway

City Dayton **State** OH **Zip** 45459

Shipped Via FED EX **Air Bill/Waybill/B.O.L. #** 6005-2897-034D – Air Bill

Number of Cartons 1 **Condition of Shipment** (Check One) [ ] Good [X] Fair [ ] Bad [ ] N/A

[X] CAP [ ] GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Compressed Hexane Gas	28347-I	CON	3	Bottle	$35.00 (E)	$105.00
2	C-Flex Tubing/Size 15	CH0003	CON	4	Roll	$36.00 (E)	$144.00
3	0-25 PSI Cal Regulator	182937	EXP	2	Each	$47.00 (E)	$94.00
						↑	
						Estimated or Quoted pricing	

Discrepancies: **Overage** [ ] **Shortage** [ ] **Damaged** [X] **Other** _____

Describe discrepancies in detail (list below)

Box of C-Flex tubing crushed. Tubing slightly damaged. Still usable.

Received By: T. Receiver **Employee #** 02468

PCR: J. Employee **Employee #** 12345

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EXAMPLE

Consumable Stock Record Log

GOVERNMENT OWNED MATERIAL

Contractor Acquired (CAP)

Office Location DEN

Contract # 69-W9-0115 **WA#** 47-7NM9.0 **Project #** 168921
Unit of Meas. ROLL **Part #** CH0003
Starting Bal. 0 **Start Date** 1/22/98 **Nomenclature** Compressed Hexane Gas
Minimum O/H **Maximum O/H** **Site Location** Someplace, Colorado

Note: (E)=Estimated or Quoted cost

Qty O/H	Qty Issued	Issue Date	Emp. # Issued To	Qty Rec'd	Rec'd Date	Expense Report Date or PO#	Unit Cost	Total Cost	Emp. # Posted By	Issued For	Remarks
0				3	1/22/98	PO 654321	$35.00(E)	$105.00	12345		
3	1	1/22/98	13579				$35.00	$35.00		.40.50	
2	1	1/26/98	13579				$35.00	$35.00		.40.75	
1	1	1/29/98	13579				$35.00	$35.00		.40.40	
0											

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EXAMPLE

Receiving Report (RR) Form

PO, PR or Shipper ↓

Order # PO 654321 **Buyer** K. Buyer/00359 **Date** 01/22/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address Hazco, 6501 Centerville Business Parkway

City Dayton **State** OH **Zip** 45459

Shipped Via FED EX **Air Bill/Waybill/B.O.L. #** 6005-2897-034D – Air Bill

Number of Cartons 1 **Condition of Shipment** (Check One) ☐ Good ☒ Fair ☐ Bad ☐ N/A

☒ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Compressed Hexane Gas	28347-I	CON	3	Bottle	$35.00 (E)	$105.00
2	C-Flex Tubing/Size 15	CH0003	CON	4	Roll	$36.00 (E)	$144.00
3	0-25 PSI Cal Regulator	182937	EXP	2	Each	$47.00 (E)	$94.00
						↑	
						Estimated or Quoted pricing	

Discrepancies: **Overage** ☐ **Shortage** ☐ **Damaged** ☒ **Other** _____

Describe discrepancies in detail (list below)

Box of C-Flex tubing crushed. Tubing slightly damaged. Still usable.

Received By: T. Receiver **Employee #** 02468

PCR: J. Employee **Employee #** 12345

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EXAMPLE

Expendable Stock Record Log
GOVERNMENT OWNED MATERIAL
Contractor Acquired (CAP)

Office Location DEN

Agency US EPA
Contract # 69-W9-0115 **WA #** 47-7-NM9.0 **Project #** 168921.40.50
Log Start Date 01/20/98 **Site Location** Somewhere, Colorado

Note: (E)=Estimated or Quoted cost

Item #	Part #	Nomenclature	Rec'd Date	PO #	Unit Cost	Disposition Date	Dispositioned By	Disposition Remarks
1		Sledge Hammer	1/19/98	12345	$28.87			
2		Channel Lock Pliers	1/19/98	12345	$21.08			
3	182937	0-25 PSI Cal Regulator	1/22/98	12345	$47.00 (E)			
4	182937	0-25 PSI Cal Regulator	1/22/98	12345	$47.00 (E)			
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

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EXAMPLE

Receiving Report (RR) Form

Expense Report Actual or Estimated Date ↓

Order # 01/26/98 - Exp. Report **Buyer** J. Employee **Date** 01/19/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **DO/WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address True Value Hardware

City Anywhere **State** CO **Zip**

Shipped Via Hand Carried **Air Bill/Waybill/B.O.L. #**

Number of Cartons **Condition of Shipment** (Check One) ☐ **Good** ☐ **Fair** ☐ **Bad** ☒ **N/A**

☒ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Sledge Hammer, 8 lb.		EXP	1	Each	$27.87	$27.87
2	Channel Lock Pliers		EXP	1	Pair	$21.08	$21.08

Discrepancies: **Overage** ☐ **Shortage** ☐ **Damaged** ☐ **Other** N/A

Describe discrepancies in detail (list below)

Received By: J. Employee **Employee #** 12345

PCR: J. Employee **Employee #** 12345

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EXAMPLE

Receiving Report (RR) Form

PO, PR or Shipper ↓

Order # PO 654321 **Buyer** K. Buyer/00359 **Date** 01/22/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address Hazco, 6501 Centerville Business Parkway

City Dayton **State** OH **Zip** 45459

Shipped Via FED EX **Air Bill/Waybill/B.O.L. #** 6005-2897-034D – Air Bill

Number of Cartons 1 **Condition of Shipment** (Check One) ☐ **Good** ☒ **Fair** ☐ **Bad** ☐ **N/A**

☒ CAP ☐ GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	Compressed Hexane Gas	28347-I	CON	3	Bottle	$35.00 (E)	$105.00
2	C-Flex Tubing/Size 15	CH0003	CON	4	Roll	$36.00 (E)	$144.00
3	0-25 PSI Cal Regulator	182937	EXP	2	Each	$47.00 (E)	$94.00
						↑	
						Estimated or Quoted pricing	

Discrepancies: **Overage** ☐ **Shortage** ☐ **Damaged** ☒ **Other** _____

Describe discrepancies in detail (list below)

Box of C-Flex tubing crushed. Tubing slightly damaged. Still usable.

Received By: T. Receiver **Employee #** 02468

PCR: J. Employee **Employee #** 12345

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PMARS DATA ENTRY SHEET

NOTE: ALL NEW RECEIPTS MUST HAVE A RECEIVING REPORT ATTACHED

[X] New [ ] Change

PROPERTY IDENTIFICATION NUMBER G100605 **Date Received** 01/25/98

Description MULTI-METER **Serial #** XYZ 4597-057

Manufacturer XYZ Electronic Meter Company **Model #** XYZ2893

Acquisition Cost $287.85 **Year Manufactured** 1997 **Ownership** [ ] CH2M Hill

[ ] Non Government Client

[X] Government

[X] CAP [ ] GFP

Agency US EPA

Contract # 69-W9-0115 **WA#** 47-7NM9.0 **Project #** 168921.40.50

RR Order # PO 456789 **Buyer** K. Buyer/00359

Maintenance Required: (check one) **Quarterly** [ ] **Semi Annually** [ ] **Annually** [X] **Other** [ ] **No Maintenance Required** [ ]

Physical Location (job address) Field Office at Somewhere, Colorado

Superfund Site **Yes** [ ] **No** [X]

PCR Name J. Employee **Employee #** 12345

Remarks: Equipment is a Line Item in contract. Calibrate prior to use.

FOR PMARS INPUT USE ONLY:
Item Code:
Date input into PMARS
Input by:

CH2MHILL

EXAMPLE

Receiving Report (RR) Form

PO, PR or Shipper ↓

Order # PO 456789 **Buyer** K. Buyer/00359 **Date** 01/25/98
(IE: P.O. #, Expense Report Date, Gov. Doc., etc.) (Purchase Agent, Field Tech #)

Contract # 69-W9-0115 **WA #** 47-7NM9.0 **Project #** 168921.40.50

Vendor Name & Address XYZ Electronics, 911 Sea View Drive

City Bangor **State** ME **Zip** 04401

Shipped Via FED EX **Air Bill/Waybill/B.O.L. #** 37059-2882-092F

Number of Cartons 1 **Condition of Shipment** (Check One) [X] **Good** [ ] **Fair** [ ] **Bad** [ ] **N/A**

[X] CAP [ ] GFP

Note: (E)=Estimated or Quoted Cost

Item #	Description	Part #	Property Type	Qty	UOM	Unit Cost	Total Cost
1	MULTI-METER	XYZ2893-15	EQ	1	Each	$257.85 (E)	$105.00
						↑	
						Estimated or Quoted pricing	

Discrepancies: **Overage** [ ] **Shortage** [ ] **Damaged** [ ] **Other** N/A

Describe discrepancies in detail (list below)

Box of C-Flex tubing crushed. Tubing slightly damaged. Still usable.

Received By: K. Buyer **Employee #** 00359

PCR: J. Employee **Employee #** 12345